

BULLETIN OF MISCELLANEOUS INFORMATION No. 2 1931 ROYAL BOTANIC GARDENS, KEW

XI.—A NEW HARVEYA FROM THE TRANSVAAL HIGHVELD. C. A. SMITH.

This new *Harveya* represents the fourth species so far recorded for the Transvaal, and was collected by Mr. R. A. H. Flugge de Smidt on the Golf Course of the Geduld Proprietary Mines at Dersley (Heidelberg division) in September, 1928. On revisiting the spot in December 1929, the collector also took several fine photographs of this interesting root-parasite, and generously sent a set of photographs to Kew, two of these being reproduced herewith. Thus Plate IV shows a single flowering stem in full bloom, the flowers being at first a "rich yellow, a little lighter than primrose, bleaching to a snow white in a day or two." In the dried state, as is common in the group of scrophulariaceous root-parasites to which it belongs, the whole plant dries an inky black, frequently becoming very brittle.

Both plates further show the plant in its native habitat amongst its hosts, which are of interest as belonging to very different families from those recorded for the other species of the genus, so far as the hosts of these are known. Thus *Harveya Randii* Hiern (a Transvaal species) was found by Dr. Rand to form brilliant patches of scarlet around specimens of its host, *Vahlia capensis* Thunb. (Saxifragaceae); *H. hyobanchoides* Schltr. was discovered in 1875 by the late Prof. P. MacOwan in the Albany division on the roots of several species of *Aspalathus* (Polygalaceae), particularly on *A. laricifolia* Berg; *H. capensis* Hook., the type of the generic name, was collected as far back as 1838 on the Cape Peninsula by Dr. W. H. Harvey as a parasite on the "roots of *Blaeria muscosa** and other small Ericaceae." Of the other species there appear to be no records of their host plants. This new *Harveya*, however, appears to confine itself to the Compositae (with a tentative record for an undetermined leguminous plant), having been recorded by Mr. Flugge de Smidt on *Conyza podocephala* DC., *Haplocarpha scaposa* Harv., *Berkheya Radula* (Harv.) O. Hoffm. and *Senecio asperulus* DC. (the last not shown in the illustrations).

Full data are not available at the moment, but it appears that "roots" from the same stem of the parasite attach themselves indiscriminately to the roots of the hosts mentioned, a condition not so far met with in the writer's experience of South African root-parasites. Thus *Striga bilabiata* (Thb.) O. Ktze. (= *S. Thunbergii* Bth.), *S.*

**Scyphogyne inconspicua* Brongn. of Fl. Cap. iv. i. 407 (1906) = *S. (Blaeria) muscosa* Dryand Steud. Nom. ed. 2. i. 568 (1840), not "in syn." as given in the Ind. Kew.

lutea Lour., *S. elegans* Benth. (the "witch weed" group), and *S. gesnerioides* (Willd.) Vatke [= *S. orobanchoides* (R. Br. ex Endl.) Bth.] have frequently been carefully dug up in the natural habitat round Pretoria, but so far their "roots" have invariably been found associated with those of one particular host only—various species of *Sporobolus*, *Eragrostis*, *Indigofera* etc.—although these grow freely intermixed—the same species of parasite being found on different hosts in the same area.

Very little, however, is known about the host plants of the South African root- (as well as stem-) parasites, except perhaps in the case of the so-called "economic" species*—the "witch-weeds" above noted—and a most interesting field yet awaits exploration.

Harveya anisodonta sp. nov. [Scrophulariaceae-Gerardieae]; *H. Randii* Hiern et *H. crispulæ* Conr. affinis, sed ab illo florum colore, ab utraque squamis et calyce glabris, filamentis brevioribus in medio corollæ tubo insertis, indumento diverso vestitis differt; etiam *H. speciosæ* Bernh. valde affinis, sed ovario glabro facile distinguitur.

Herba erecta, usque 25 cm. alta, in radicibus *Berkheya Radulæ* (Harv.) O. Hoffm., *Conyzae podocephalæ* DC. et aliarum parasitica, radicibus verrucosis tuberculatis, tumentis sede ortus e hospite instructis. *Folia* squamiformia, laxè imbricata in ima parte plantæ, plus minus oblata, apice rotundata, basi vix angustata et late amplexicaulia, erecto-adscendentia, cauli adpressa, usque 5 mm. longa et 7 mm. lata, glaberrima. *Squamæ* oppositæ vel suboppositæ, ovatæ, usque 2.5 cm. longæ et 1 cm. latæ, in apicem acutam angustatæ, basi late amplexicaules, erecto-adscendentes, vel cauli adpressæ, extra plus minus manifeste nervatæ, utrinque glaberrimæ. *Spica* terminalis, brevis, 4–8-flora. *Flores* magni et speciosi, versus maturitatem albi. *Bracteæ* oblongo-ovatæ, calyce breviores, in apicem acutam usque subacutam angustatæ, basi late amplexicaules, usque 2.3 cm. longæ et 8 mm latæ, glaberrimæ. *Bracteolæ* binæ, lineares usque anguste oblongo-lineares, subcutæ, usque 2 cm. longæ, glabræ. *Calyx* tubuloso-cylindricus, usque 3 cm. longus (dentibus inclusis) et 8 mm. latus, valde inaequaliter dentatus, inter dentes duo inferiores profunde fissus, subbilabiat, intus extraque glaber; dentes duo inferiores tribus superioribus longiores; dentes superiores plus minus connati ad denticulos tres parvos subacutos deltoideos redacti. *Corolla* usque 6 cm. longa, e calyce longe exserta, in limbum quinquelobum patentem ampliata; tubus parte inferiore anguste cylindricus, plus minus inflatus, pilis articulatis glanduliferis patentibus dense vestitus; limbus usque 3 cm. diametro; lobi late orbiculares, patentes, usque 7 mm. diametro, margine tenuiter crispulo-undulati, extra dense pubescentes, intus et fauce crispulo-pilosi; duo superiores breviores et angustiores. *Filamenta* subaequilonga, usque 4 mm. longa, inclusa, ad basin corollæ

*See "The Problem of the 'Witchweed'" by H. H. W. Pearson.—Union Department of Agriculture Bulletin No. 40, 1913.

PLATE IV



Photo : R. Flugge de Smidt.

Harveya anisodonta C. A. Sm., showing a single specimen in natural habitat with host plants, *Conyza podocephala* DC. and *Haplocarpha scaposa* Harv., amongst grasses, *Themeda* and *Eragrostis* spp.

PLATE V



Photo: R. Flugge de Smidt.
Harveya anisodonta C. A. Sm., showing five young shoots in the natural habitat with three host plants, *Conyza podocephala* DC., *Haplocarpha scapoza* Harv., and *Berkheya Radula* (Harv.) O. Hoffm., the last (with the widest leaves) not yet in flower.

tubi partis inflatae inserta, parte inferiore dense pilosa. *Antherae* 2-thecae, glabrae; theca fertilis semilunaris, usque 4 mm. longa, apicem liberum versus subacuminata; theca sterilis brevior, a fertili in modum calcaris brevis curvati pallide mucronati divergens. *Ovarium* ovoideum, basi constrictum, disco parvo affixum, in stylum sensim attenuatum, glaberrimum; stylus filiformis, corollae tubo brevior, usque 2.5 cm. longus; stigma oblique clavatum, circiter 2 mm. diametro, subcompressum, antheris imminens, glabrum. *Capsula* non visa.

TRANSVAAL. Heidelberg Div. : at Dersley, on the Golf Course of the Geduld Proprietary Mines, Sept., *Flugge de Smidt* ! s.n. (type in Nat. Herb. Pretoria).

XII.—ON THE DISTRIBUTION OF PSEUDOLARIX FORTUNEI, THE GOLDEN LARCH. W. R. PRICE.

As it does not appear to be generally realized that the distribution area of this interesting tree is no longer confined to its three original, classical localities of over 60 years ago, and as one of these localities is most persistently and misleadingly misquoted as being in the province of Kiangsu, instead of Kiangsi, a statement seems to be called for, giving as far as possible an accurate and up-to-date account of the area within which the tree is now known to be found in China.

The following is a list of localities in order of discovery :—

1. Fortune—1853. Near the monastery of Tsan-tsin, about a day's journey S.W. of Ningpo, at lat. $29^{\circ} 30'$ in the province of Chekiang at an altitude of 1000 to 1500 ft. Trees were 120–130 ft. high by 5 ft. girth up to some 50 ft. from the ground.

2. Fortune—1854. Twenty miles W. of the above locality, near Quanting monastery in Chekiang, a plantation on a mountain slope at 4000 ft. The largest tree was 130 ft. by 8 ft. The trees appeared to have been planted. (Probably rediscovered in 1874 by the Rev. Moule.)

3. Abbé David—1868. On the Lushan Mountains S. of Kiukiang in Kiangsi (not Kiangsu, as usually stated). Maries recorded the same locality later, and was struck by the huge size of the trees, though Wilson more recently recorded only small trees.

4. Handel-Mazzetti—1914 to 1918—in the course of his travels in Central China during this period discovered the Golden Larch in Hunan province, no less than 500 km. S.W. of its nearest known Kiukiang locality. He states that the trees grow in considerable quantity in the Warm Temperate Zone in mixed forest, above Ngandjapu near the town of Hsinhwa on the Hsikwang-shan, on sandstone at 700 m., and are 20 m. high.

5. R. C. Ching, of the Metropolitan Museum, Nanking, in 1924, while botanising in Anhwei, found the tree growing quite wild to the height of 80 ft. in mixed forest over much of the district between the Yangtze and the Chekiang border, especially N.W. of Hweichow.

In 1925 he also found it in the S.W. corner of Kiangsu, west of the Tai-hu lake.

He also states that the tree is fairly common in the south and west of Chekiang, especially in the Chuchow-Kinhwa district.

He considers that these districts, in which he has himself seen the tree, are the headquarters of the species at the present time.

6. F. P. Metcalf writes in September, 1929, "Recently it has also been found in S.W. Chekiang rather near the border of Fukien."

The writer, while travelling in Fukien province in the summer of 1912, observed a group of tall larch near the small village of Chih-a-na about 60 miles N.W. of Amoy up the West River, on the path to Lung-yen (Leng-nga). The trees grew beside a stream in a wooded valley, and were about 80 ft. high. There being no low branches and no means of felling a tree at the time, unfortunately no specimen was obtainable. A photograph was, however, taken, and was, through the kindness of Professor F. P. Metcalf, Professor of Botany at the Fukien Christian University at Foochow, shown last year to Dr. Rehder in America, who pronounced it to be probably *Pseudolarix Fortunei*, the first record for Fukien.

Mr. Ching, however, informs the writer that from the photograph he would suspect the tree to be *Glyptostrobus heterophyllus*, on account of its low situation by a stream. This record must therefore be considered a doubtful one.

Thus we have at present for this tree's distribution area, omitting the Fukien locality, a narrow wedge-shaped area based upon the coast of Chekiang, extending westwards for some 700 miles with its apex in the middle of Hunan, and including parts of the provinces of Anhwei, Kiangsu, Kiangsi, and Hunan, and the whole of Chekiang.

As this tree seems to grow exclusively in upland and hilly districts, it is more than probable that it will eventually be found to occur over a wider area in the mountainous parts of the southern Chinese provinces.

I am indebted to Mr. R. C. Ching for much information.

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XIII.—NEW ASIATIC GENTIANAS : II.* C. V. B. MARQUAND.

The complete revision of the Chinese Gentians mentioned in the former paper of this series has been held back for three years pending

*Continued from *K.B.* 1928, p. 62.

the publication of an account, by Dr. Harry Smith of Upsala, of the Gentianaceae collected in China by himself and other botanists. This postponement was considered advisable in order that the various novelties contained in these collections might be included in the revision, and also in order to avoid any possible duplication in the description of new species. As the account in question has not yet appeared, it is now proposed to issue the revision of Chinese Gentians without further delay. In the meantime a considerable amount of further Asiatic material of *Gentiana* has passed through the writer's hands, including the twenty-nine new species and ten new varieties described below. Where not otherwise stated, the type specimens are in the Kew Herbarium.

During the course of the present investigation it was found that the treatment of *Crawfurdia* Wall. as a genus independent from *Gentiana* could no longer be maintained. *Crawfurdia* was based by Wallich (Tent. Fl. Nap. 63, tt. 47, 48: 1826) on two new Nepalese species, *C. fasciculata* and *C. speciosa*, which differed by their climbing habit from all the Gentians then known. All subsequent authors have retained the genus *Crawfurdia*, distinguishing it from *Gentiana* solely on the ground of its twining stems and drooping flowers. But *Gentiana filigaulis* Hemsl. (Sect. *Stenogyne*) is a species which exhibits distinct signs of a climbing habit, though its flowers are terminal and more nearly erect than they are in many other species of *Gentiana* of which the stems are erect. On the other hand, *Gentiana crawfurdoides*, a new species described below, has a wide range of habit from distinctly twining stems to erect stems which though spirally twisted are not more so than is frequently the case in *Gentiana sensu stricto*.

In any case, *Crawfurdia* as a whole is a rather unnatural group and cannot be maintained as at present delimited, even as a subdivision of *Gentiana*. Its two sections, *Dipterospermum* and *Tripterospermum*, are, however, natural and well marked by the seed characters, so that they are here transferred as Sections to *Gentiana*. The third Section of *Crawfurdia*, namely, *Pterygocalyx*, which was originally described as a genus by Maximowicz, is excluded from *Gentiana* on account of its floral characters, which agree with those of *Gentianella*.

In consequence of the reduction of the genus *Crawfurdia*, new specific epithets are unfortunately required for seven species, as the epithets concerned had already been used for other species of *Gentiana*.

Sect. *Dipterospermum*.

1. *Gentiana Heleni* Marquand, nom. nov., is proposed for *Crawfurdia Trailiana* Forrest in Notes Roy. Bot. Gard. Edin. xvii. 76 (1907), intending to perpetuate the name of Professor James William Helenus Trail, M.D., F.R.S., in whose honour the original name was given to this magnificent plant. The specific epithet *Trailiana* is occupied by *Gentiana Trailiana* Forrest, a Chinese species of *Gentianella*.

2. *Gentiana fratri* Marquand, nom. nov., replaces *Crawfurdia Delavayi* Franch. in Bull. Soc. Bot. France, xlv. 306, in order to retain the connection with the French missionary Delavay who discovered so many new species of plants in Western China. The original specific epithet is already occupied in *Gentiana* by *G. Delavayi* Franch., the only Chinese representative of Sect. *Isomeria*.

3. *Gentiana khamensis* Marquand, nom. nov., is substituted for *Crawfurdia thibetica* Franch. in Bull. Soc. Bot. France, xlv. 307. The original specific epithet is used in *Gentiana tibetica* King ex Hook. fil., a species belonging to Sect. *Aptera*.

4. *Gentiana fascicularis* Marquand, nom. nov., is proposed for *Crawfurdia fasciculata* Wall. Tent. Fl. Nap. 63, t. 47. The specific epithet has been employed for a Formosan species, *Gentiana fasciculata* Hayata in Journ. Coll. Sci. Tokyo, xxv. Art. 19, 165.

5. *Gentiana Kingdonii* Marquand, nom. nov., replaces *Crawfurdia Wardii* Marquand in Journ. Linn. Soc., Bot. xlviii. 203, which was named after the collector, Capt. F. Kingdon Ward, the specific epithet being already occupied by *Gentiana Wardii* W. W. Sm. in Notes Roy. Bot. Gard. Edin. viii. 122, a species of Sect. *Frigida* from China and South-Eastern Tibet.

6. *Gentiana confusa* Marquand, nom. nov., is proposed for *Crawfurdia affinis* C. B. Clarke in Hook. fil. Fl. Brit. Ind. iv. 107, which was founded on Wall. Cat. 4370 *pro parte*. The specific epithet has been used for *Gentiana affinis* Griseb. Gen. et Sp. Gent. 289, a north-west American species.

Sect. *Tripterospermum*.

7. *Gentiana Golowninia* Marquand, nom. nov., is substituted for *Crawfurdia japonica* Sieb. et Zucc. in Abh. Akad. Muench. iv. part 3, 160 (*Golowninia japonica* Maxim. in Bull. Acad. Pétersb. iv. 252, cum tab.). The specific epithet is already occupied by *Gentiana japonica* Schult. Syst. vi. 174, as well as by the later homonym *G. japonica* Maxim. in Bull. Acad. Pétersb. xx. 433.

In addition, the following transfers from *Crawfurdia* to *Gentiana* are made without change of specific epithet.

Sect. *Dipterospermum*.

8. *Gentiana speciosa* (Wall.) Marquand, comb. nov.

9. *Gentiana angustata* (C. B. Clarke) Marquand, comb. nov.

10. *Gentiana Bulleyana* (Forrest) Marquand, comb. nov.

11. *Gentiana campanulacea* (Wall. et Griff.) Marquand, comb. nov.

Sect. *Tripterospermum*.

12. *Gentiana luteo-viridis* (C. B. Clarke) Marquand, comb. nov.

The genus *Gentiana* is here restricted to subgenus *Eugentiana* Kusnez., as delimited in Kusnezow's "Subgenus *Eugentiana* Kusnez. generis *Gentiana* Tournef." (Act. Hort. Petrop. xv. : 1896-1904). *Gentianella* differs in the calyx-tube being homogeneous instead of being provided with an adnate inner membrane, and in the corolla, which lacks the plicae between the lobes. The following Sections of *Gentiana*, all recognised by Kusnezow, are represented in China in addition to *Dipterospermum* and *Tripterospermum*, which are now transferred from *Crawfurdia*:—*Pneumonanthe* (Kusnez. l.c. 179), *Otophora* (l.c. 246), *Stenogyne* (l.c. 248), *Frigida* (l.c. 254), *Aptera* (l.c. 291), *Isomeria* (l.c. 339), *Chondrophylla* (l.c. 344).

The writer desires to thank Dr. E. D. Merrill, Director-in-Chief of the New York Botanical Garden, for the opportunity of examining all the Asiatic material in that Herbarium and in the Herbarium of the University of California. To Dr. Maxon and Dr. Ellsworth P. Killip he desires to express his appreciation of the privilege of seeing the whole of the Chinese specimens of *Gentiana* in the United States National Herbarium, Washington, including the extensive collections made by Mr. Rock. He is also indebted to Professor Lecomte and to Professor Issatchenko for the same favour with regard to type-specimens in the Herbaria of the Muséum d'Histoire Naturelle Paris and the Principal Botanic Garden, Leningrad, respectively.

Descriptions of new Species and Varieties.

***Gentiana eurycolpa* Marquand** sp. nov. (Sect. *Stenogyne*); ex affinitate *G. gentilis* Franch., sed calycis lobis lanceolatis basi attenuatis, tota planta multo majore inter alia differt.

Annual. Stems glabrous, upwards of 20 cm. long, creeping, rather slender, tetragonous, narrowly 4-winged, with numerous spreading branches 5-6 cm. long, each terminated by a solitary sessile flower and one pair of leaves. *Basal leaves* none. *Cauline leaves* sessile, broadly ovate or cordate-ovate, up to 1.5 cm. long and broad, margin minutely denticulate. *Calyx-tube* 10-12 mm. long, 4-5 mm. in diameter at the mouth, slightly expanded in the middle, with 5 narrow wings bordered with short purple multicellular hairs; lobes 5, lanceolate-spathulate, acute, 5-6 mm. long, 2-2.5 mm. wide, narrowed at the base into a rotundate sinus. *Corolla* subcylindrical, 3.5-4.5 cm. long, pale purple; tube scarcely 1 cm. in diameter at the mouth; lobes 5, ovate, acute or subacuminate, not caudate, about 1 cm. long, 4-5 mm. wide; plicae shortly laciniate at the apex, less than half the length of the lobes. *Stamens* two-thirds to three-quarters the length of the corolla, inserted 1 cm. above the base of the tube; filaments arcuate, free above; anthers 2 mm. long. *Ovary* stipitate. *Ovules* triquetrous (mature seeds not seen).

CHINA. Yunnan: Grassy hills, La-kou, 2400-3000 m., October, *E. E. Maire* 7404 (Herb. Univ. Calif. 388169, type); Kin-tchongchan, 2600 m., flowers blue, *E. E. Maire* 2910 (Herb. Univ. Calif. 388159); without locality, *Henry* 10023.

This species is undoubtedly closely allied to *G. gentilis*, and less so to *G. pterocalyx* Franch.

***Gentiana discoidea* Marquand** sp. nov. (Sect. *Dipterospermum*) ; *G. fascicularem* Marquand simulans, sed foliis subsessilibus, calycis tubo vix carinato lobis brevissimis differt.

Perennial. Stems climbing, much twisted, internodes long. Leaves in pairs, ovate-lanceolate, acute, 5–6 cm. long, 2–2.5 cm. wide, very shortly petiolate, margin obscurely crenulate or subentire, glaucescent beneath, nerves 3–5. Bracts lanceolate, leaflike, the uppermost 1–2 cm. long, the lower larger. Flowers axillary, solitary or 2 together. Calyx entire ; tube 12–14 mm. long ; lobes erect, linear, 2–3 mm. long. Corolla subcylindrical, more or less curved, 4 cm. long, pale purple ; lobes ovate, acuminate, 7–8 mm. long, 6 mm. wide ; plicae rotundate, entire, 3.5 mm. wide, 1.5 mm. long. Stamens 3 cm. long ; filaments incurved at the apex with a narrow wing on both sides ; anthers 1.5 mm. long. Ovary stipitate, oblong, 2 cm. in length. Style 6–7 mm. long. Stigma recurved. Mature capsule semi-exserted from the corolla tube. Seeds almost completely surrounded by a discoid wing, 3 mm. in diameter, double on the narrow side.

CHINA. W. Hupeh : without precise locality, Oct. 1900, E. H. Wilson (Veitch Exped.) 1742 (type) ; Patung district, A. Henry 1038, 2848, 4877.

***Gentiana crawfurdioides* Marquand** sp. nov. (Sect. *Dipterospermum*) ; ex affinitate *G. Wardii* W. W. Sm., sed ovario stipitato stylo brevi inter alia differt.

Perennial. Roots filiform, not arising from an enlarged caudex. Stems erect or semi-scandent, slightly twining, rather lax, up to 4.5 cm. high, glabrous, dark purplish, subterete or slightly tetragonous and obscurely winged, slightly exceeding 1 mm. in diameter near the base. Leaves in pairs, rather distant, ovate, acuminate, very shortly petiolate, 2.5–3.5 cm. long, 1.5–2.5 cm. wide ; nerves 3, rather prominent, connivent, meeting at the apex of the acumen. Flowers solitary or rarely 2 together, terminal, on pedicels up to 5 cm. in length. Calyx dark purple ; tube dimidiate-spathaceous, 2 cm. long ; lobes narrow lanceolate, acute, 3–4 mm. long, more or less recurved. Corolla infundibular, 4–5 cm. long, deep purple maroon in colour ; lobes ovate, scarcely more than 2 mm. longer than the erose sub-truncate plicae. Stamens considerably shorter than the corolla tube ; filaments with a double wing, the upper 7–8 mm. free. Ovary stipitate, ovoid, 1.5 cm. long. Style short. Stigma recurved. Style equalling the ovary in length. Ovules discoid (mature seeds not seen).

S. E. TIBET. Tsarong : in heavy pastures on the Ka-gwi-pu, Mekong-Salwin Divide, lat. 28° 30' N., 3600–3900 m., Sept. 1917, G. Forrest 14789 (type in Herb. Edin.) ; Doker-la, Mekong-Salwin Divide, lat. 28° 20' N., 3600–3900 m., Aug. 1918, G. Forrest 16880.

This species shows a clear connection with the Sect. *Stenogyne* of *Gentiana*, the stems being spirally twisted to a slight extent only.

var. **macrophylla** Marquand var. nov. ; a typo differt foliis ad 9 cm. longis, 4 cm. latis.

S. E. TIBET. Tsarong : on scrub and grass in open, dry situations, Shweli-Salwin divide, lat. $25^{\circ} 40' N.$, 2100 m., Sept. 1919, G. Forrest 18522.

N. E. UPPER BURMA. Scandent plant of 60–120 cm., flowers deep purplish blue, on grass and dwarf cane on the western flank of the N' Maikha-Salwin Divide, lat. $26^{\circ} 45' N.$, long. $98^{\circ} 48' E.$, 3400–3600 m., Oct. 1925, G. Forrest 27442.

Gentiana bomareoides Marquand sp. nov. (Sect. *Dipterospermum*) ; ex affinitate *G. speciosae* (Wall.) Marquand, sed antheris parvis, calycis lobis magnis spathulatis, foliis quinquenervatis insigniter differt.

Twining plant, 1.5–2.5 m. high. Stems subtetragonous, strongly twisted, 2 mm. in diameter. Internodes about 12 cm. long. Leaves in pairs, ovate-acuminate, 5–6 cm. long, 2.5 cm. wide, round at the base, membranaceous, 5-nerved ; petiole 6 mm. long. Flowers borne 5–6 together on short branches. Bracts lanceolate, 1–1.5 cm. long. Calyx-tube 8–9 mm. long, 4–5 mm. in diameter ; lobes 5, spathulate, 6–10 mm. long, 3–4 mm. wide, attenuate to 1–1.5 mm. at the base, apex acute, sinus rounded. Corolla subinfundibuliform, purple-rose ; tube 3–4 mm. in diameter below, expanded above ; lobes triangular, acute, 3 mm. long, 3–4 mm. wide ; plicae rounded, 2.5–3.0 mm. wide. Stamens scarcely 3 mm. long ; filaments free throughout the upper part, with a broad hyaline wing on each side, attenuate to the apex ; anthers 2.5 mm. long. Ovary stipitate, elliptic-fusiform, about 1.5 cm. long. Style 3–4 mm. long. Immature seed with a discoid wing (mature capsule not seen).

N. E. UPPER BURMA. On scrub and grass on the west flank of the N' Maikha-Salwin Divide, lat. $26^{\circ} 45' N.$, long. $98^{\circ} 48' E.$, 2100–2400 m., Oct. 1925, G. Forrest 27558.

Gentiana sinkuensis Marquand sp. nov. (Sect. *Dipterospermum*) ; affinis *G. Delavayi* Franch. (e descr.), sed floribus fasciculatis, calycibus dimidiato-fissis inter alia differt.

Twining plant. Stems subtetragonous, twisted, dark purplish. Internodes 6–7 cm. long. Leaves in pairs, ovate-lanceolate, acuminate, 4 cm. long, 1.5 cm. wide, three-nerved, margin minutely sinuose, very shortly petiolate. Flowers terminal and axillary. Pedicels 1–3 cm. long, slender. Calyx dimidiate-spathaceous ; tube 1–1.5 cm. long, purplish, divided to the middle ; lobes three, linear, 3–4 mm. in length, strongly recurved. Corolla subinfundibuliform, slightly gibbous above the calyx, 3 cm. in length, washy purple ; lobes auriculate, acute, 2.5–3.0 mm. long, 3.0–3.5 mm. wide ; plicae rounded or subtruncate, slightly shorter than the lobes. Stamens 2.5 cm. long, upper 1 cm. free ; filaments with a subulate

wing on each side; anthers oblong, 1.5 mm. long. *Ovary* stipitate, elliptic-ovate, attenuate at apex and base. *Stipe* 1-1.5 cm. long. *Style* 6-7 mm. long. *Stigma* recurved. *Immature seed* with narrow wings (mature seeds not seen).

UPPER BURMA. Valley of the Seinghku near the Tibetan frontier, lat. 28° N., long. 97° 25' E., in alpine meadow which clothes the steep flanks of the gullies, Sept. 27, 1926, *F. Kingdon Ward* 7495.

Gentiana iochroa Marquand sp. nov. (Sect. *Dipterospermum*); ex affinitate *G. crawfurdioides* Marquand, sed floribus sessilibus, calycibus integris vel dimidiato-fissis inter alia differt.

Perennial. *Stem* erect, 30-60 cm. high, showing more or less distinct spiral twisting on its own axis, scarcely tetragonous, purple. *Leaves* broadly ovate or suborbicular, up to 3 cm. long, 2.5 cm. wide, apex more or less acuminate, usually 5-nerved, sessile. *Flowers* sessile or subsessile, terminal and axillary. *Calyx-tube* 1 cm. long, entire or subdimidiate-spathaceous; lobes 5, erect, 3 mm. long, linear or linear-lanceolate, acute. *Corolla* subinfundibular, slightly expanded above the calyx, 3.0-3.5 cm. long, purplish-rose, marked a deeper shade; lobes deltoid; plicae subtruncate, erose, slightly shorter than the lobes. *Stamens* 2.5 cm. long, upper half free from the corolla-tube; anthers small, cordate-ovate, less than 2 mm. long; filaments winged on both sides. *Ovary* ellipsoid, shortly stipitate. *Style* long. *Ovules* discoid (mature seeds not seen).

S. E. TIBET. Tsarong: open pastures on the margins of forests on the Salwin-Kiu-chiang Divide, lat. 28° 40' N., long. 98° 15' E., Aug., 1919, *G. Forrest* 18794 (type in Herb. Edin.).

Gentiana curviflora Marquand sp. nov. (Sect. *Dipterospermum*); ex affinitate *G. iochroae* Marquand, sed floribus curvatis inter alia distinctissima.

Perennial. *Stems* subtetragonous, ascending, reddish purple, glabrous, 20-30 cm. in length, arising from an underground caudex. *Hypophylls* numerous, rosulate-ovate, 2-3 mm. in length at the base of the stems. *Cauline leaves* resembling the hypophylls in the basal one or two pairs, then rapidly increasing in size to 2.5 cm. long, 2 cm. wide, cordate-ovate, acute or acuminate, subsessile, subcoriaceous, margin scabrid. *Flowers* solitary, terminal. *Calyx* dimidiate-spathaceous; tube reddish-purple, up to 1.5 cm. long; lobes spatulate, 3-6 mm. long. *Corolla* distinctly curved, infundibuliform, 4 cm. long; lobes 5, ovate, acute, 8 mm. long, 7 mm. wide; plicae truncate. *Stamens* 5, free above; filaments with two broad scarious wings; anthers oblong, 6 mm. long. *Ovary* stipitate, ellipsoid, 1.5 cm. long, 5 mm. wide. *Stipe* stout, longer than the ovary. *Ovules* discoid (mature seeds not seen).

CHINA. S. Szechuan: Muli, on shady limestone cliffs, 2700-3000 m., Aug. 31, 1921, *F. Kingdon Ward* 4880 (type in Herb. Edin.).

This species is very remarkable in the form of the corolla, the tube being distinctly curved. The leaves much resemble species

belonging to Sect. *Stenogyne* in the characteristic shape and texture and scabrid margin.

***Gentiana semialata* Marquand** sp. nov. (Sect. *Dipterospermum*) ; ex affinitate *G. curviflorae* Marquand, sed filamentis uno latere alatis, corolla vix curvata inter alia insigniter differt.

Perennial. Stems erect, 20-25 cm. high (roots not seen), arising from a caudex which bears the saccate bases of the previous year's growth. Leaves in pairs, graduated in size from the base upwards, cordate-ovate, acuminate, 1-3 cm. long, 7-18 mm. wide, very shortly petiolate, subcoriaceous, margin scabrid. Flowers sessile. Calyx entire, narrowly carinate; tube 1 cm. long; lobes spathulate-ovate, acute, 6-7 mm. long. Corolla infundibular, 5 cm. long, violet; lobes 5, deltoid, 7 mm. long, 6 mm. wide; plicae subtruncate, scarcely erose. Stamens considerably shorter than the corolla tube; filaments with the uppermost 10-12 mm. free, lower half of the free portion unilaterally winged, upper half filiform; anthers 6-7 mm. long. Ovary stipitate, 12 mm. long, attenuate above into the short style. Style about equalling the ovary in length. Ovules discoid (mature seeds not seen).

CHINA. W. Szechuan: on limestone cliffs, Litang-Yalung Divide, 10 miles east of Litang River, 3600 m., Oct. 20, 1921, *F. Kingdon Ward* 4984 (type in Herb. Edin.).

***Gentiana membranacea* Marquand** sp. nov. (Sect. *Dipterospermum*) ; inter species hujus sectionis foliis membranaceis lanceolatis acuminatis distinctissima.

Scandent shrub, up to 3 m. Stem more or less terete, much twisted, with long internodes. Leaves in pairs, lanceolate, acuminate, rounded at the base, entire, membranaceous; nerves 3-5; petiole up to 2 cm. in length. Flowers axillary, 2-3 together, on slender pedicels, 1.5-3.0 cm. long. Calyx dimidiate-spathaceous, truncate between the lobes; tube 8-12 mm. long; lobes setaceous or linear-acuminate, 8-9 mm. long. Corolla narrowly infundibuliform; lobes deltoid, acute; plicae truncate. Stamens 2.5 cm. long; filaments slender, subulate, winged on both sides on the portion (1.3 cm. in length) which is free from the corolla tube; anthers ovoid, 1 mm. long. Ovary shortly stipitate, 1-1.5 cm. long, attenuate above. Style 1 cm. long (mature seeds not seen).

N. E. UPPER BURMA. On scrub and cane on the margins of thickets, 3000-3400 m., lat. 26° 23' N., long. 98° 48' E., Sept. 1924, *G. Forrest* 25060.

***Gentiana Pricei* Marquand** sp. nov. (Sect. *Dipterospermum*) ; ex affinitate *G. campanulaceae* (Wall.) Marquand et *G. Bulleyanae* (Forrest) Marquand, sed a priore foliorum nervis 5-7, a posteriore petiolis brevioribus calycis lobis deltoideis recurvatis differt.

Climbing herb. Stem subterete, twisted, about 2 mm. in diameter, green tinged with purple, bearing numerous axillary flowering

branches. *Internodes* up to 15 cm. in length. *Leaves* in pairs, lanceolate to ovate-lanceolate, acuminate, 7-10 cm. long, 2.5-3 cm. wide, round at the base; margin narrowly recurved and minutely sinuose, nerves 5-7, scaberulous, petiole 3-4 mm. long. *Flowering branches* 10-20 cm. long, bearing 3-6 flowers in one or two whorls. *Bracts* lanceolate, 6-7 mm. long. *Pedicels* up to 4 cm. long. *Flowers* subpendulous. *Calyx-tube* entire, up to 1.5 cm. long; lobes 5, linear-lanceolate, acute, strongly recurved, 4-6 mm. long. *Corolla* subinfundibuliform, slightly expanded at the base of the throat, 3-4 cm. long; lobes deltoid, acute, 5 mm. long and broad; plicae subtruncate with an erose margin. *Stamens* slightly shorter than the corolla tube; filaments broadly winged in the lower part, tapering to a subulate apex; anthers triangular, 2.5-3.0 mm. long. *Ovary* stipitate, ellipsoid, 6-8 mm. long, attenuate above and below. *Stipe* 1.5 cm. long. *Style* 4-5 mm. long. *Immature seeds* 0.5-0.7 mm. in diameter, surrounded by a discoid wing (mature fruit not seen).

CHINA. Fukien: open mountainous country between Lung-yen and Eng Hok, 900 m., Sept. 22, 1912, W. R. Price 1169.

***Gentiana sessiliflora* Marquand** sp. nov. (Sect. *Dipterospermum*); ex affinitate *G. semialatae* Marquand, sed antheris multo brevioribus, calycis lobis triangularibus insigniter differt.

Climbing herb. *Stem* 80 cm. high, brownish purple, subterete, scarcely winged, spirally twisted, 2-3 mm. in diameter. *Internodes* 3-4 cm. in length near the base, 8-11 cm. long above. *Leaves* in pairs, sessile, those on the lower part of the stem ovate, acute, 1-2 cm. long, 6-8 mm. wide, rounded at the base, upper leaves lanceolate, up to 4 cm. long. *Bracts* lanceolate, sessile, 2-2.5 cm. long. *Flowers* in pairs. *Calyx-tube* entire, 1-1.5 cm. long; lobes triangular acute, about 5 mm. long, sinus very narrow. *Corolla* infundibuliform-campanulate, 5 cm. long; lobes 5, deltoid; plicae rotundate, erose, 4 mm. wide. *Stamens* 4 cm. long; filaments winged on one side only; anthers sagittate, 3.5 mm. long. *Ovary* stipitate. *Stipe* 2 cm. long. *Immature seed* with a discoid wing (mature capsules not seen).

WESTERN CHINA. Probably W. Szechuan: without precise locality, Sept. 1904, E. H. Wilson (Veitch Exped.) 4150.

Only a single specimen of this rather strikingly distinct species is known. It is most unfortunate that as the ovules are so young there is some doubt as to the affinity of the plant.

***Gentiana Nienkui* Marquand** sp. nov. (Sect. *Dipterospermum*); ex affinitate *G. fascicularis* Marquand, sed corollae plicis triangularibus, staminibus multo longioribus differt.

Scandent plant, reaching a height of 2.5 m. *Stem* subterete, twisted, about 1.5 mm. in diameter, dark purple. *Internodes* up to 9 cm. long. *Leaves* ovate-lanceolate, acuminate, cordate at the base, 5-8 cm. long, 2-3 cm. wide; petiole up to 1 cm. in length. *Bracts* minute, linear-lanceolate. *Flowers* axillary, 1-3 together.

Calyx 5-lobed ; tube 1 cm. long, 0.5 cm. in diameter at the mouth ; lobes linear, equalling the tube. *Corolla* narrowly infundibular, 5 cm. long, greenish and purple striped, unspotted ; lobes ovate, apiculate, 7 mm. long, 6 mm. wide ; plicae triangular, 5 mm. wide, 3 mm. long, margin minutely erose. *Stamens* nearly as long as the corolla tube ; filaments with a narrow wing on each side, upper 2 cm. free, apex recurved ; anthers cordate-ovate, scarcely 2 mm. long, slightly exceeding the stigma. *Ovary* subsessile, oblong, attenuate at the apex, 3 mm. wide. *Style* about 1.5 cm. long, rather stout. *Immature seeds* triquetrous with three narrow wings (mature fruit not seen).

CHINA. Hongkong : in a wood, Jan. 4, 1930, N. K. Chun 4011.

This species appears to be extremely rare, since only a single specimen was collected. Professor W. Y. Chun informs me that immediately it was brought in in the fresh state he sent the collector (his nephew) to look for more specimens in the same wood, but two whole days were spent in the search without success. The name commemorates the collector, Mr. Nienku-Chun. One half of the specimen has been presented to Kew by Professor W. Y. Chun.

***Gentiana dimidiata* Marquand** sp. nov. (Sect. *Dipterospermum*) ; ex affinitate *G. fascicularis* Marquand et *G. membranaceae* Marquand, a priore tubo calycis dimidiato-fissis, a posteriore antheris multo majoribus et ovario stipitato differt.

Perennial. *Stems* scandent, 2-3 m. high, subterete, spirally twisted. *Internodes* long. *Leaves* in pairs, lanceolate, up to 10 cm. long, 3 cm. wide, apex acuminate, curved, rounded at the base ; nerves 3-5 ; petiole 8-10 mm. long, 1.5 mm. in diameter. *Flowers* both axillary and terminal, more or less pendulous, borne on slender, terete pedicels up to 3.5 cm. in length. *Calyx* dimidiate-spathaceous ; tube membranaceous, 12-14 mm. long, 4-5 mm. in diameter, divided to below the middle, nerves distinct, not keeled. *Corolla* purple-lilac, darker on the exterior ; tube infundibular, 3.5 cm. long, 1.5 cm. wide at the mouth ; lobes 5, deltoid, acute or acuminate, 3-4 mm. long, 3 mm. wide ; plicae subtruncate or rounded, slightly erose, much shorter than the lobes. *Stamens* 5 ; lower half of filaments united to the corolla-tube, upper half with a broad scarious wing on one side and very narrow wing on the other side ; anthers oblong, 3 mm. long. *Ovary* stipitate, elliptic-oblong, 10-12 mm. long, 2.5 mm. wide, attenuate at apex and base. *Style* 3-4 mm. long. *Stigmatic lobes* recurved. *Ovules* discoid (mature seed not seen).

CHINA. Yunnan : on cane scrub in side valleys on the Shweli-Salwin Divide, lat. 20° 45' N., long. 98° 58' E., 3000 m., Sept. 1924, G. Forrest 25225.

***Gentiana cordata* Marquand** sp. nov. (Sect. *Dipterospermum*) ; affinis *G. fasciculari* Marquand, sed foliis cordatis, floribus terminalibus fere solitariis differt.

Scandent herb. Stems subterete, purplish, internodes up to 18 cm. long. Leaves in pairs, cordate-ovate, acute or acuminate, 8-12 cm. long, 4-5.5 cm. wide, margin entire; nerves 3-5; petiole 1.5-2 cm. long, 1-2 mm. wide. Flowers axillary, solitary or 2-3 together, pedicellate. Bracts minute, linear-lanceolate. Calyx narrowly keeled; tube 10-12 mm. long, 5-6 mm. wide at the mouth; lobes filiform, acute, 1.5 cm. long, sinus rather narrow. Corolla narrowly infundibular, 3-4 cm. long; lobes ovate, subacute, 5-6 mm. long, 3-4 mm. wide; plicae rounded, erose, scarcely half the length of the lobes. Stamens 3.5 cm. long; filaments subulate, narrowly winged on both sides above the point of attachment to the corolla-tube; anthers oblong-ovoid, 2-2.5 mm. long, 1 mm. wide. Ovary sessile, attenuate at the apex. Style very long. Ovules ovoid (mature seeds not seen).

CHINA. W. Szechuan: Mount Omei, July 1904, E. H. Wilson (Veitch Exped.) 5105A (type) and 5105; without precise locality, 1500-2100 m., Oct. 1903, "flowers bluish," E. H. Wilson (Veitch Exped.) 4151; Mount Omei, 1350 m. and 1200 m. respectively, Faber 171, 293; without precise locality, A. Henry 8881; near Ta-chien-lu, 2700-4000 m., Pratt 431.

CHINA. Yunnan: Yeng Chen Lin mountain, forests 2100 m., "flowers pink purple," A. Henry 11186.

***Gentiana caudata* Marquand** sp. nov. (Sect. *Dipterospermum*); ex affinitate *G. fascicularis* Marquand, sed corollae lobis caudatis, foliis bracteisque dissimilaribus insigniter differt.

Perennial. Stems slender, subtetragonous, spirally twisted and loosely twining, up to 50 cm. high, arising from a small nodose rhizome. Radical leaves none. Lower cauline leaves cordate-ovate, acute or subacute, up to 3 cm. long, 2.5 cm. wide, margin entire; midrib and one pair of lateral nerves conspicuous on the underside; petiole 3-4 mm. long. Upper cauline leaves and bracts much narrower, lanceolate, not exceeding 9 mm. in width; petioles about 4 mm. in length. Flowers solitary, terminal and axillary. Calyx tubular, scarcely keeled; tube 10-12 mm. long; lobes 5, linear, erect or slightly recurved at the apex, 3.5-5 mm. long; sinus truncate, 1.5-2 mm. wide. Corolla narrowly infundibuliform, 3.5-4.5 cm. long, pink; lobes 5, ovate-lanceolate, acute, caudate, 5-7 mm. long, 3.5-4 mm. wide, with tails about 1 mm. long; plicae rounded, erose, 3 mm. wide, less than half the length of the lobes. Stamens 5; filaments slightly longer than the corolla-tube, recurved at the apex, the upper 1.3-1.5 cm. free from the corolla-tube, subulate, very narrowly winged on both sides; anthers ovoid, scarcely 2 mm. long. Ovary stipitate, narrow, elliptic-oblong, attenuate at the apex. Style 8-12 mm. long. Style 1 cm. or more in length. Stigmatic lobes recurved at the apex. Ovules winged (mature seed not seen).

CHINA. Szechuan: North Wushan, without precise date, A. Henry 7091 (type).

HUPEH. Nanto and mountains to northward, *A. Henry* 4463.

This is a very distinct species which has been confused with *Gentiana fascicularis*. It is remarkable for the heterophylly, the tailed corolla lobes and very long stamens, the anthers being semi-exserted.

Gentiana Golowninia *Marquand*, supra p. 70 (Sect. *Tripterosperrum*) var. ***oblonga*** *Marquand* var. nov.; a typo differt capsula oblonga 15–20 mm. longa 5–7 mm. lata, foliis lanceolatis acuminatis longe petiolatis usque ad 15 cm. longis 4·5 cm. latis.

CHINA. Hupeh: S. Wushan, on grassy mountains, flowers blue, *E. H. Wilson* (Veitch Exped.) 1687; Chienshih, without precise date, *A. Henry* 7416.

Gentiana dendrologi *Marquand* sp. nov. (Sect. *Aptera*); affinis *G. tibeticae* King, sed bracteis multo minoribus, necnon inflorescentiis recedit; a *G. Fettisowii* Regel et Winkl. calycibus quinquentatis differt.

Perennial, up to 30 cm. in height. *Basal leaves* scarcely petiolate, lanceolate or linear, 12–25 cm. long, 2–3 cm. wide, attenuate into the more or less sheathing base, shortly acuminate to a sub-obtuse apex, with a rather broad midrib and 4–6 lateral nerves. *Bracts* sessile, narrow lanceolate, 4–7 cm. long, 1–1·5 mm. wide. *Cauline leaves* 4–5 pairs, up to 9 cm. long, 1–1·5 cm. wide, apex sub-acute. *Flowers* sessile or subsessile in the upper whorls, long-pedunculate in the axils of the uppermost leaf-like bracts. *Calyx* dimidiate-spathaceous, submembranaceous; tube 1·5 cm. long; lobes 5, filiform, scarcely 2 mm. long. *Corolla* 3–3·5 cm. long, white; tube cylindrical, about 1 cm. in diameter; lobes ovate, subobtus; plicae truncate, 4 mm. long, 5 mm. wide. *Stamens* free, 2 cm. long; filaments slender; anthers 2·5 mm. long. *Ovary* shortly stipitate, 2 cm. long. Immature seeds ovoid, not winged (mature seeds not seen).

WESTERN CHINA. Grasslands, without precise locality, 3000 m., August 1903, *E. H. Wilson* (Veitch Exped.) 4130 (type), excluding large basal leaves; alpine meadows, 3000–3400 m., July 1903, *E. H. Wilson* (Veitch Exped.) 4125.

This species is named in honour of the late Mr. E. H. Wilson, the distinguished botanical traveller whose tragic death occurred recently. It is distinguished from the Siberian species *Gentiana Fettisowii* Regel et Winkl. by the calyx having five short filiform lobes instead of the three characteristic of that species. From *G. macrophylla* Pall., which it much resembles, it may be recognised immediately by the larger flowers with stamens which are twice as long as in that species, as well as by the narrower bracts. *G. tibetica* King and *G. robusta* King differ in the densely crowded flowers and aggregated upper leaves.

It should be noted that the large basal rosette leaves which were collected with *E. H. Wilson* 4130 and are mounted on the type sheet, do not belong to this species but appear to be *G. crassicaulis* Duthie.

***Gentiana wutaiensis* Marquand** sp. nov. (Sect. *Aptera*) ; ex affinitate *G. siphonanthae* Maxim., sed floribus paucioribus, capsula stipitata, corollae plicis brevioribus, inter alia differt.

Perennial (roots not seen). *Stems* decumbent, subterete, purplish, up to 18 cm. long, moderately stout (basal leaves not seen). *Cauline leaves* usually in three pairs with very long internodes, lanceolate or linear-lanceolate, acute, 5-7 cm. long, 6-7 mm. wide, united at the base to form a deep sheath. *Flowers* sessile, several together, closely congested, terminal and axillary on the penultimate node. *Bracts* like the leaves. *Calyx* dimidiate-spathaceous, membranous, purplish ; tube 8-9 mm. long ; lobes 5, linear, about 1.5 mm. long. *Corolla* tubular-campanulate, 2-2.5 cm. long, blue above, paler below ; lobes 5, ovate, rounded at the apex, 4 mm. long, 3 mm. wide ; plicae triangular, acute, scarcely one-third the length of the lobes. *Stamens* 5, 1.5-1.7 cm. long ; filaments filiform, free from the corolla-tube above the middle ; anthers subsagittate, 3 mm. long. *Ovary* shortly stipitate, elliptic-oblong, attenuate at the apex. *Style* 2.5 mm. long. *Ovules* elliptic-oblong, smooth (mature seed not seen).

CHINA. Shansi: Wu-tai-shan, 1876, *Hancock* (Kew No.) 62 ; open mountain slope within alpine region on the same mountain, 1800-3000 m., July 18, 1919, perennial herb, calyx purplish, petals blue and lighter at the lower part, *T. Tang* 1110.

***Gentiana wasenensis* Marquand** sp. nov. (Sect. *Frigida*) ; ex affinitate *G. Purdomii* Marquand, sed calycis lobis minutis subulatis, floribus sessilibus differt.

Perennial. *Caudex* small, giving rise to numerous fleshy roots, 2 or 3 short barren stems and a solitary flowering stem. *Leaves of the barren stems* narrow, linear-lanceolate, up to 7 cm. long, 7 mm. wide, apex subobtuse, base attenuate into the sheathing petiole. *Flowering stems* up to 20 cm. high, tetragonous, glabrous, green suffused with purple, bearing 2 or 3 pairs of cauline leaves. *Cauline leaves* lanceolate, 4.5-6 cm. long, 1.5 cm. wide, apex subobtuse, attenuate into the petiole at the base ; nerves 3. *Flowers* 6-8 together in a congested terminal pseudo-umbellate inflorescence, and usually one borne in the axil of the penultimate pair of leaves. *Calyx-tube* entire, 8-9 mm. long, about 4 mm. in diameter at the mouth ; lobes minute, erect, subulate (scarcely 1 mm. in length). *Corolla* infundibular, 3 cm. long, 1.5 cm. in diameter at the mouth, blue ; lobes unilaterally ovate, obtuse, twisted to the left ; plicae truncate, erose. *Stamens* free ; filaments narrow subulate, 2 cm. long ; anthers 2.5 mm. long. *Ovary* stipitate, 1.5 cm. long. *Stipe* 1.5 cm. long. *Stigma* subsessile. *Ovules* not winged (mature seeds not seen).

CHINA. W. Szechuan : Wên-chuan-hsien, wa-sen country, alpine meadows, 3000-3600 m., July, 1908, *E. H. Wilson* (Arn. Arb. Exped.) 2457.

***Gentiana subocculta* Marquand** sp. nov. (Sect. *Frigida*) ; ex affinitate *G. heptaphyllae* Balf. fil. et Forrest, sed foliis calycem obtegentibus 2 mm. latis, ramis erectis vel ascendentibus vix decumbentibus differt.

Perennial. Stems erect, or more rarely somewhat decumbent, 12-18 cm. high, with internodes 5-7 mm. long, arising from a caespitose base, terete, rather stout, bearing a single terminal flower, and short vegetative stems up to 2.5 cm. high, bearing ovate, acute, membranous hypophylls up to 8 mm. long, 5 mm. wide. Leaves on the flowering stems 7 in a whorl, those of the lower whorls ovate or obovate, 4.5 mm. long, 2 mm. wide, those of the upper whorls congested around the calyx, linear, acute, 12-16 mm. long, 2 mm. wide. Flowers subsessile. Calyx-tube 7-8 mm. long ; lobes 7, spatulate, acute, 8 mm. long, 2 mm. wide. Corolla subinfundibular, slightly gibbous above the calyx, 4-4.5 cm. long, clear sky blue, lined on the exterior dark blue and green ; lobes 7, deltoid, caudate, 5-7 mm. long, 5-6 mm. wide ; plicae rounded or subtruncate, much shorter than the lobes. Stamens 7, filaments 2.5 cm. long, lower half united to the corolla-tube ; anthers oblong, 2 mm. long, 0.5-0.7 mm. wide. Ovary stipitate, elliptic-oblong. Style very short. Ovules ovoid, exalate (mature seed not seen).

CHINA. N. W. Yunnan : on open moist stony meadows, Mekong-Salwin Divide north of Pien-tien Go, lat. 27° 30' N., long. 99° 30' E., 3900-4200 m., Oct. 1924, *G. Forrest* 25954 (type) ; Kari pass, near summit, between Pung-tzu-la and Shi-zo, Yangtze-Mekong Divide, in dry grassland, 4500 m., Sept. 1904, *G. Forrest* 405 ; in meadow on Mount La thou-Ch'ou K'ha, south-east of Chung-Tien, 3700 m., flowers steel blue, *Rock* 17266.

S. E. TIBET. Tsarong, moist open stony pasture on the Salwin-Kiu-chiang Divide, lat. 28° 40' N., long. 98° 15' E., *G. Forrest* 19103 ; moist meadows on the Salwin-Kiu-chiang Divide, lat. 28° 24' N., long. 98° 24' E., 3600-3900 m., Oct., 1921, *G. Forrest* 20746.

Much confusion has arisen owing to the fact that two distinct species were included in the original description of *G. heptaphylla* Balf. fil. et Forrest, represented by Forrest's numbers 45 and 405 respectively. As neither was specially cited as the type of the species and the description covers both, it becomes necessary to select one. Since no. 45 was the sheet illustrated on the plate accompanying the diagnosis, I have chosen this as the type, referring no. 405 to a new species to which I have given the name *G. subocculta* on account of the habit of the leaves.

***Gentiana hexaphylla* Maxim. var. *caudata* Marquand** var. nov. ; a typo differt corollae lobis caudatis.

CHINA. Kansu : flowers blue, on steppe, upper Kar Ching K'ou, near Old Taochow, 3800-4300 m., Aug. 28-31, 1923, *R. C. Ching* 870.

***Gentiana Arethusae* Burkill** var. ***delicatula* Marquand** var. nov. ; a typo differt foliis floribusque minoribus, corollae lobis latioribus, plicis subdeltoideis vix truncatis.

S. E. TIBET. Tsarong, plant of 7.5-12.5 cm., flowers light blue, lined darker, on open, moist stony pasture on Doker-La, Mekong-Salwin Divide, lat. 28° 20' N., 4200 m., Sept. 1917, *G. Forrest* 14854.

***Gentiana Arethusae* Burkill var. *rotundata-lobata* Marquand** var. nov. : a typo differt corollae lobis rotundatis plicis deltoideis, cum var. *delicatula* foliis floribusque minoribus quadrat.

CHINA. N. W. Yunnan : plant of 5-12.5 cm., flowers pale clear blue, greenish and darker-lined on the exterior, open moorland on the Mekong-Salwin Divide, lat. 27° 30' N., long. 98° 56' E., 4200 m., Sept. 1921, *G. Forrest* 20766.

***Gentiana emergens* Marquand** sp. nov. (Sect. *Frigida*) ; affinis *G. phyllocalyci* C. B. Clarke, sed corollae plicis triangularibus acutis, calycis dimidia parte tantum foliis oblecta.

Perennial. Stems very short, more or less caespitose, with the bases covered with the closely imbricate old dead leaves. *Leaves* of both the flowering stems and barren stems closely imbricate, obovate-spathulate, 8-9 mm. long, 6-7 mm. wide ; midrib rather conspicuous from the under surface in the dried specimens. *Flowers* solitary, terminal, shortly pedicellate or sessile, with the calyx partly enclosed by the uppermost leaves. *Calyx* tubular-campanulate ; tube 6 mm. long, 5-6 mm. in diameter at the mouth ; lobes 5, spathulate-oblong, 6-8 mm. long, 2-3 mm. wide, apex subacute ; sinus rounded or truncate. *Corolla* spindle-shaped, 3-3.5 cm. long, scarcely 1 cm. in diameter in the upper part of the tube ; plicae triangular, acute, scarcely more than half the length of the lobes and usually somewhat unilateral. *Stamens* 5, much shorter than the corolla-tube ; filaments subulate, 1.6-1.8 cm. long, free nearly to the middle ; anthers oblong, 3 mm. long. *Ovary* sessile, elliptic-oblong. *Style* very short. *Stigmatic lobes* recurved. *Ovules* ovoid, areolate (mature seeds not seen).

CHINA. S. W. Szechuan : on rocks and boulders, Mount Mitzuga, west of Muli Gomba, 3050-4875 m., June 1928, *J. F. Rock* 16591.

This new species (growing with barren stems of *Androsace villosa*?) differs from *G. phyllocalyx* Clarke in the calyx-lobes not being covered by the uppermost leaves, the triangular plicae of the corolla, as well as the smaller leaves. From *G. Wardii* W. W. Sm. it may be distinguished by the much larger flowers and leaves, as well as by the plicae.

***Gentiana trichotoma* Kusnez. var. *brevicaulis* Marquand** var. nov. ; a typo differt habitu multo brevior, tota planta vix ad 10 cm. alta.

CHINA. N. W. Yunnan : on the Peima-shan, Mekong-Yangtze divide, between Atuntze and Pangtzer, 4200-4500 m., June-July 1923, flowers Prussian blue, *J. F. Rock* 10033.

This variety does not seem to diverge in floral characters from typical *G. trichotoma*, but differs so strikingly in its dwarf habit from the extensive series of specimens of that species seen by the author that it seems worth while to give it a varietal name—*G. trichotoma* is typically a slender plant, 30–60 cm. in height.

Gentiana Chingii Marquand sp. nov. (Sect. *Frigida*); ex affinitate *G. Przewalskii* Maxim., sed foliis angustioribus, corolla caerulea multo minore differt.

Perennial. *Barren stems* short, decumbent, bearing several pairs of linear subobtusate leaves, 4–6 cm. long, 2.5–3 mm. wide. *Flowering stems* decumbent, 12–15 cm. high, slender, subterete, purple, glabrous. *Internodes* up to 6 cm. long. *Leaves* connate in pairs, linear-lanceolate, subobtusate, 2–2.5 cm. long, 2–2.5 mm. wide, leaf sheaths 3 mm. deep. *Flowers* 2–3 together, on glabrous pedicels up to 1.5 cm. long. *Calyx* tubular-campanulate; tube entire, 8 mm. long, 4 mm. wide at the mouth; lobes 5, linear, 4–6 mm. long, 1 mm. wide, apex subobtusate, sinus rather broad, truncate. *Corolla* subinfundibuliform, up to 3.5 cm. long, blue; lobes 5, ovate, acute, 3–4 mm. long, 2.5 mm. wide; plicae rounded or subtruncate, more or less erose, scarcely half the length of the lobes. *Stamens* 5, 2.5 cm. long; filaments slender, subulate, united with the corolla-tube to above their middle; anthers oblong, reddish, 2–2.5 mm. long. *Ovary* stipitate, elliptic-oblong, 8–10 mm. long, attenuate at apex and base. *Stipe* 10–12 mm. long. *Style* about 3 mm. long. *Ovules* discoid, exalate (mature seed not seen).

CHINA. Kansu: in dense tussocks, very common, Ye Cheon K'ou, near Old Taochow on the border of Tibet, 3300–3800 m., Aug. 21, 1923, *R. C. Ching* 817.

Gentiana gilvostriata Marquand sp. nov. (Sect. *Frigida*); affinis *G. stragulatae* Balf. fil. et Forrest ex Marquand, sed floribus minoribus, corolla infundibuliformi.

Perennial, subprostrate, caespitose, with rather slender rhizomes bearing numerous long, slender, little-branched roots. *Barren stems* numerous, subprostrate, terminated by a rosette of leaves. *Flowering stems* short, decumbent. *Leaves of the barren stems* oblanceolate, subobtusate, 5–7 mm. long, 2–2.5 mm. wide, apex subobtusate, attenuate at the base into the petiole; petioles short, connate in pairs into a narrow submembranous sheath. *Leaves of the flowering stems* rather densely aggregated about the base of the calyx, obovate-spathulate to oblanceolate, increasing in size from the base of the stem, up to 10 mm. long, 2–3 mm. wide, apex acute; petioles short. *Flowers* subsessile, solitary, terminal. *Calyx* tinged with dark purple; tube 10–12 mm. long, 6 mm. in diameter at the mouth; lobes suborbicular, 2.5–3.5 mm. long, 2–3.5 mm. wide, narrowed below to 1–1.5 mm.; sinus broad, rounded. *Corolla* infundibular, 3–3.5 cm. long, sea-blue; tube with clear-cut cream-coloured stripes down the inside, flanked below with five

purplish-blue dots ; lobes 5, broadly ovate, 6–7 mm. long, 5–6 mm. wide ; plicae ovate, obtuse, 2–3 mm. wide, less than half the length of the lobes. *Stamens* 2.3–2.5 cm. long ; filaments slender, subulate, lower half united to the corolla-tube ; anthers slightly curved, 2.5 mm. long, 0.5 mm. wide. *Ovary* stipitate, elliptic-oblong, attenuate at the apex into the long style. *Ovules* ovoid, exalate (mature seeds not seen).

UPPER BURMA. In open places, on rocks or gravelly patches between clumps of *Rhododendron*, on precipitous slopes facing south, in the valley of the Seinghku near the Tibetan Frontier, lat. 28° 10' N., long. 97° 20' E., 3600–3900 m., Oct. 13, 1926, *F. Kingdon Ward* 7585.

***Gentiana Handeliana* H. Sm. var. *brevisepala* Marquand** var. nov. ; a typo differt corolla caerulea, calycis dentibus brevissimis triangularibus recurvatis.

UPPER BURMA. On alpine turf slopes in the valley of the Seinghku, near the Tibetan Frontier, lat. 28° 10' N., long. 97° 20' E., 3600 m., flowers dark blue, Oct. 5, 1926, *F. Kingdon Ward* 7541.

***Gentiana Veitchiorum* Hemsl. var. *caelestis* Marquand** var. nov. ; a typo differt corollae plicis longioribus acutis, floribus pallidioribus, foliis rosulatis nullis.

CHINA. Yunnan : flowers blue, among limestone rocks on the eastern slopes of the Lichiang Snow Range, 5100 m.?, May-Oct. 1922, *Rock* 7785 ; flowers blue with yellow stripes, in alpine meadows on the eastern slopes of Lichiang Snow Range in the Yangtze watershed, 4500 m., Sept. 1923, *Rock* 10858.

***Gentiana sino-ornata* Balf. fil. var. *punctata* Marquand** var. nov. ; a typo differt habitu graciliore, corollae tubo punctato.

N. E. UPPER BURMA. Tufted plant of 2.5–3.5 cm., flowers with bright blue interior, exterior lined deeper blue and greyish green, in open moist stony alpine meadows on the western flank of the Chimi-li N'Maikha-Salwin divide, lat. 26° 23' N., long. 98° 48' E., 3400–3600 m., Nov. 1924, *G. Forrest* 25423 ; plant of 7.5–12.5 cm., flowers bright clear blue lined dark purple on exterior, on moist alpine pasture and by streams on western flank of the N'Maikha-Salwin divide, lat. 26° 25' N., long. 98° 48' E., 4200–4500 m., Oct. 1925, *G. Forrest* 27450 ; plant of 2.5–5 cm., semiprocumbent, flowers in bud, deep blue, in moist stony meadows on the western flank of the N'Maikha-Salwin divide, lat. 26° 45' N., long. 98° 48' E., 4200 m., Oct. 1925, *G. Forrest* 27749 ; corolla sea-blue at the mouth, fading through paler blue to almost white at the base, where it is striped and dotted with blue, on open patches of gritty loam (granite) between clumps of dwarf *Rhododendron* on sunny slopes in the Valley of the Seinghku near the Tibetan frontier, lat. 28° 10' N., long. 97° 20' E., 3600 m., Oct. 13, 1926, *F. Kingdon Ward* 7586.

CHINA. N. W. Yunnan : tufted plant of 2.5–3.5 cm., flowers with bright blue interior, exterior lined deeper blue and greenish grey,

in open moist alpine meadows on the Chien-Chuan-Mekong divide, lat. 26° 40' N., long. 98° 40' E., 3900–4200 m., Oct. 1922, *G. Forrest* 22602; flowers blue and yellow, in alpine meadow, Mt. Fu-chuan, west of Wei-Hsi, Mekong-Salwin divide, 4460 m., Sept.-Oct. 1929, *Rock* 18346.

***Gentiana choanantha* Marquand** sp. nov. (Sect. *Chondrophylla*); ex affinitate *G. Maximowiczii* Kusnez., sed foliis caulinis linearibus, et *G. aristatae* Maxim., a qua corollae lobis acutis cuspidatis plicis acutis differt.

Annual? Stems numerous, patent or ascending from a basal rosette, up to 5 cm. long. Basal leaves broadly ovate, 7–8 mm. long, 4–5 mm. wide, mucronate, with a cartilaginous margin. Cauline leaves lax, linear, acute, erect, 4–6 mm. long, united in pairs at the base. Flowers solitary, terminal. Pedicels up to 1.5 cm. long. Calyx 6 mm. long; lobes triangular, acute, 2 mm. long. Corolla infundibular, 8–10 mm. long, rose-purple; tube marked inside with dark lines, curving downward at the height of the anthers; lobes acute, triangular, 2 mm. long; plicae about three-quarters the length of the lobes, subacute with suberose margin. Stamens 5–6 mm. long; filaments filiform; anthers less than 1 mm. in diameter. Ovary stipitate, obovoid-oblong, 3–4 mm. long. Style short. Stigmatic lobes recurved. Capsule semiexserted, with a narrow wing at the apex. Seed 1 mm. long, trigonous, with a reticulate surface.

CHINA. W. Szechuan: near Ta-chien-lu, without precise locality, 2700–4000 m., *A. E. Pratt* 512 (type); without precise locality 3300–3600 m., July 1903, *E. H. Wilson* (Veitch Exped.) 4140A; Miuya country, south of Ta-chien-lu, Yulong-hsi, on grassy slopes, 4120 m., flowers purplish blue, July 1929, *J. F. Rock* 17485.

E. TIBET. Kiala: Tongola, 1893, *J. A. Soulié* 877.

***Gentiana pedicellata* Griseb.** var. ***Chingii* Marquand** var. nov.; a typo differt corollae tubo multo angustiore, foliis rosulatis ovatis vix 1.5 cm. longis, plicis subdeltoideis obtusis.

CHINA. Anhwei: under shade, 630 m., flowers whitish, July 12, 1925, *R. C. Ching* 4157.

***Gentiana macraucena* Marquand** sp. nov. (Sect. *Chondrophylla*); ex affinitate *G. chungtienensis* Marquand, sed capsula longissime exserta inter alia insigniter differt.

Annual. Stems erect, up to 5 cm. high, glabrous, dark brown. Rosette leaves ovate, 8–10 mm. long, 7 mm. wide, very shortly mucronate with a narrow cartilaginous margin. Cauline leaves lanceolate, acute or acuminate, up to 6 mm. long, 2 mm. wide, connate at the base into a membranous sheath, with a scarious margin. Calyx-tube narrow, up to 8 mm. long, 3 mm. wide at the mouth; lobes triangular, acute, up to 3 mm. long, with a narrow scarious margin. Corolla tubular, up to 1.5 cm. long; lobes 5, ovate, about 2 mm. long, 1–1.5 mm. wide; plicae triangular. Stamens

up to 8 mm. long ; filaments filiform, uppermost 3 mm. free. *Ovary* stipitate. *Stigma* subsessile. *Capsule* ovoid, the two halves recurving when mature. *Stipe* growing out to a length of 4-5 cm. in the fruiting stage, about 1.5 mm. in diameter, semitranslucent. *Seed* trigonous, scarcely 1 mm. long, rugose.

S. E. TIBET. Tsarong : in fruit on open moist pasture and boulders on Ka-gwr-pw, Mekong-Salwin divide, lat. 28° 25' N., 3600-3900 m., July 1917, *G. Forrest* 14196.

Gentiana moniliformis *Marquand* sp. nov. (Sect. *Chondrophylla*) ; ex affinitate *G. pedicellatae* Wall., sed calycis lobis corollam subaequantibus, stipite multo crassiore differt.

Annual. *Stems* ascending, up to 6 cm. long, glabrous, slightly branched. *Rosette leaves* obovate-spathulate, up to 1.7 cm. long, 4-5 mm. wide, acuminate, 6-nerved. *Cauline leaves* lanceolate, recurved, attenuate into the petiole, 6-7 mm. long, 3 mm. wide, connate in pairs. *Flowers* borne terminally on the branches, shortly pedicellate. *Calyx-tube* 5-6 mm. long, 2.5-3.0 mm. in diameter ; lobes 5, spatulate-ovate, slightly recurved, 2-3 mm. long, apex acute. *Corolla* only slightly exceeding the calyx, pale greenish blue ; lobes 5, deltoid, acuminate ; plicae subtruncate. *Stamens* short. *Ovary* stipitate. *Stigma* subsessile. *Capsule* 4 mm. long, ovoid, much exserted from the corolla on a stout stipe 2-2.5 mm. in diameter. *Seed* oblong, scarcely 0.5 mm. in length, reticulate with minute moniliform ridges.

CHINA. Yunnan : marshy pasture on hills east of Tengyueh, lat. 25° N., 2100 m., May 1912, *G. Forrest* 7655.

This interesting species has very minute seeds which are decorated by moniliform ridges forming a reticulum with elongated meshes, precisely as is found in the type specimens of *Gentiana decemfida* Ham., from which species it may be distinguished immediately by the calyx almost equalling the corolla in length.

Gentiana Parryae *Marquand* sp. nov. (Sect. *Chondrophylla*) ; ex affinitate *G. Bodinieri* Léveillé, sed corolla multo brevior vix usque ad 1.5 cm. longa, foliis rosulatis nullis inter alia insigniter differt.

Annual. *Stem* erect, up to 15 cm. long, terete, scaberulous, dark brown, about 1 mm. in diameter, the lowest 10 cm. naked. *Internodes* 1-2 cm. long. *Leaves* in pairs, elliptic, acute at the apex and attenuate at the base, 4 cm. long, 7 mm. wide, with an extremely narrow cartilaginous margin. *Bracts* minute, acuminate. *Flowers* on short branches. *Calyx-tube* 3 mm. long ; lobes 5, triangular, 5 mm. long, scarcely 1 mm. wide. *Corolla* obconic to subinfundibular, 1-1.5 cm. long ; tube 3-3.5 mm. wide at the mouth ; lobes 5, ovate, 2.5 mm. long, 2 mm. wide ; plicae triangular, acute, slightly more than half the length of the lobes. *Stamens* 5, slightly shorter than the corolla tube ; anthers narrow, oblong, 3 mm. long ; filaments subulate, united to the corolla-tube through

half their length. *Ovary* shortly stipitate. *Style* 2-3 mm. long. *Stigmatic lobes* recurved. Immature *capsule* obovoid, carinate. Immature *seed* minute, elongate, smooth (mature seed not seen).

INDIA. Assam: Lushai Hills; Tailiphai, growing in shade, 1500 m., May 1927, Mrs. Parry 168.

Gentiana subuniflora Marquand sp. nov. (Sect. *Chondrophylla*); ex affinitate *G. chungtienensis* Marquand, sed corollae lobis obtusis ecaudatis differt.

Annual. *Stems* unbranched, very short, erect or decumbent. *Leaves* crowded, ovate, acuminate, 2.5-3.5 mm. long, 2-3 mm. wide, margin narrow, cartilaginous, apex acute slightly recurved. *Flower* solitary, terminal, sessile, the lower part of the calyx immersed in the imbricating uppermost leaves. *Calyx* tubular; tube 6-8 mm. long, 3 mm. wide at the mouth; lobes 5, lanceolate-ovate, acute, 2-3 mm. long. *Corolla* infundibular, bright blue; lobes 5, ovate, obtuse, 3.5-4.5 mm. long, 4 mm. wide, plicae minute, triangular, scarcely half the length of the lobes. *Stamens* 5; filaments slender, filiform, 12-14 mm. long, united throughout half their length, and incurved at the extreme apex; anthers cymbiform, scarcely 1 mm. long. *Ovary* stipitate, elliptic-oblong, attenuate into the stipe and abruptly attenuate into the style at the apex. *Style* 2 mm. long, slender. Immature *seeds* fusiform, 0.5 mm. in length, not winged. Mature *capsule* not known.

W. CHINA. Flowers bright blue, heaths without precise locality, 4300-4500 m., June 11, 1904, E. H. Wilson (Veitch Exped.) 4132.

Gentiana radiata Marquand sp. nov. (Sect. *Chondrophylla*); ex affinitate *G. Piasezkii* Maxim., sed foliis caulinis acuminatis margine cartilagineis, foliis rosulatis ovatis acutis, staminibus brevioribus differt.

Annual. *Stems* 2-7, radiating from the base, unbranched, glabrous, up to 6 cm. long, 1 mm. in diameter. *Radical leaves* few, sessile, ovate, acute, 6-8 mm. long, 4-5 mm. wide, with a distinct scaberulous, cartilaginous margin. *Cauline leaves* in pairs, scarcely patent, lanceolate, acute, 6-7 mm. long, 2-2.5 mm. wide, with a wide thin scarious margin. *Flowers* solitary, terminal, on pedicels 8-12 mm. long. *Calyx* tubular-campanulate; tube 6-8 mm. long, 4-5 mm. in diameter at the mouth; lobes 5, triangular, acute, cuspidate, 6-7 mm. long, 1.5 mm. wide at the base, with a narrow scarious margin; sinus acute, with the inner membrane visible within. *Corolla* infundibular, 2-2.5 cm. long, blue; tube 5 mm. in diameter at the mouth; lobes 5, ovate, mucronate, 5-6 mm. long, 5 mm. wide; plicae rounded, suberose, 4-5 mm. wide, shorter than the lobes. *Stamens* 5, 1.5 cm. long; filaments slender, united with the corolla-tube to above the middle; anthers ovoid, 1.5 mm. long. *Ovary* shortly stipitate, elliptic-oblong. Mature *seeds* not seen.

CHINA. Szechuan: Muli district, Mount Siga, north-east of Kulu, in meadows, 4150 m., June 1929, J. F. Rock 17886.

***Gentiana anisostemon* Marquand** sp. nov. (Sect. *Chondrophylla*); affinis *G. nanobellae* Marquand, sed foliis caulinis ovatis acutis, calycis lobis multo longioribus attenuatis inter alia differt.

Annual. Stems terete, glabrous, much branched, up to 6 cm. high, purple-tinged. *Rosette leaves* broadly ovate, mucronate, 8–10 mm. long, 6–8 mm. wide, with a narrow cartilaginous margin, dark purple. *Cauline leaves* in pairs, lanceolate, ovate-lanceolate or oblong-lanceolate, mucronate, 7–9 mm. long, 2.5–3.5 mm. wide, clasping the stem but not imbricate; margin scarious, wide in the upper leaves, narrower in the lower. *Flowers* solitary, shortly pedicellate, terminal on each of the branches. *Calyx* tubular, tinged with purple; tube 5 mm. long, 3 mm. wide at the mouth; lobes triangular, acute, 3–4 mm. long, 1.5 mm. wide at the base, margin scarious, widening from apex to base, sinus acute. *Corolla* subinfundibular, about 1.5 cm. long, rich blue; tube 5–6 mm. in diameter at the throat; lobes 5, ovate, 4–4.5 mm. long, 2.5–3 mm. wide; plicae broadly ovate or subtruncate, 2–2.5 mm. wide, shorter than the lobes, margin irregularly serrate. *Stamens* 5, of unequal length; filaments slender, 7–10 mm. long, united with the corolla-tube to about the middle; anthers ovoid, 1.5–2 mm. long. *Ovary* stipitate, elliptic-oblong, attenuate at the apex and base. *Style* 2 mm. long, *Stigmatic lobes* recurved. *Ovules* minute, oblong, smooth (mature seed not seen).

CHINA. Yunnan: in alpine meadow on the eastern slopes of the Lichiang Snow range, 3600 m., May 2, 1923, *J. F. Rock* 8339.

XIV.—DIOSCOREA: SECTION STENOCOREA.

D. PRAIN AND I. H. BURKILL.

We are indebted to the kindness of Dr. A. F. G. Kerr, Director of the Botanical Section of the Ministry of Commerce and Communications, Siam, and of Dr. E. D. Merrill, Director-in-Chief of the New York Botanical Garden, for the opportunity of studying material representing two species of the genus *Dioscorea*, section *Stenocorea*. This enables us to state that the section now includes five species.

The male flowers of all are known; the female flowers of *D. stenomeriflora*, *D. daunaea* and *D. sumatrana*. Mature fruits of *D. sumatrana* and *D. paradoxa* are known and half-ripe fruits of *D. daunaea*. The underground parts of *D. paradoxa* alone are known, but some imperfect material of *D. daunaea* is available.

The additional material now at our disposal involves the necessity of describing a new species and enables us to provide an amplified account of the section.

In the Section *Stenocorea* the underground parts consist of a woody knot which gives rise to storage tubers laterally, to feeding roots above the tubers, and to a bud, destined to become the woody knot of next year, which appears by the side of the functioning stem. The storage tubers descend direct into the earth. The stem twines to the left and is unarmed. The male flowers, which open

wide, are pedicelled and are produced singly along the axis of the spike-like raceme: they have a disc upon the edge of which six fertile stamens are carried. The female flowers are pedicelled, and rather large. The ovules are produced towards the middle of the placenta. The capsules are large, deflexed, the pedicel of the flower becoming a rigid curved stalk: the wings dehisce along the whole of the suture, and allow the seeds to glide out. The seeds are winged all round.



Distribution of *Dioscorea* species.

1, *stenomeriflora*. 2, *daunaea*. 3, *keduensis*. 4, *sumatrana*. 5, *paradoxa*.

Among the *Dioscoreas* of Asia which twine to the left, *Stenocorea* alone has capsules from which the seeds escape in this fashion: in this respect and in the shape of the capsules it agrees with the section *Enantiophyllum*. It is also like *Enantiophyllum* in the way in which its storage tubers are formed, but in every other respect it differs from that section. In the direction of the twining of the stem it agrees with all the sections except *Enantiophyllum*. The male flowers are in structure as in the sections *Stenophora*, *Shannicorea*, *Combilium* and *Paramecocarpa*: and abundantly distinct from those

in the sections *Opsophyton*, *Lasiophyton* and *Enantiophyllum*. They are produced singly as in the section *Combilium* and the three sections just named. The seeds are winged all round as in *Combilium* and *Enantiophyllum*; but the capsule of *Combilium* is reflexed in the only specimen known.

The following artificial key to the five species of *Stenocorea* may be useful.

Leaves twice as long as broad :

♂ flowers not reflexed : leaves rather firm.....*stenomeriflora*.

♂ flowers reflexed : leaves thin :

♂ flowers on pedicels only 1.5 mm. long.....*daunaea*.

♂ flowers on pedicels 4-5 mm. long.....*keduensis*.

Leaves about as broad as long :

♂ flowers greenish-yellow, shaped as in the last two :

♀ inflorescence long : fruits very large.....*sumatrana*.

♂ flowers more sparse, with shorter perianth-lobes, reddish : ♀ inflorescence apparently with one flower only : fruits smaller..... *paradoxa*.

1. **D. stenomeriflora** *Prain et Burkill* in Journ. As. Soc. Bengal, N.S. 10, 1914, p. 40 : Ridley, Flora Mal. Penins. 4, 1924, p. 319.

MALAY PENINSULA. Perak and southwards to Singapore.

2. **D. daunaea** *Prain et Burkill* in Journ. As. Soc. Bengal, N.S. 4, 1908, p. 450 ; and in Kew Bull., 1927, p. 230.

SIAM, in the moister parts and just into TENASSERIM.

3. **D. keduensis** *Prain et Burkill* in Kew Bull., 1925, p. 59.

EASTERN JAVA and SOUTHERN CELEBES.

4. **D. sumatrana** *Prain et Burkill*, sp. nov.

NORTH-EASTERN SUMATRA.

5. **D. paradoxa** *Prain et Burkill* in Kew Bull., 1927, p. 246.

EAST-CENTRAL SIAM.

The following is a description of *D. sumatrana*.

D. sumatrana *Prain et Burkill*, sp. nov. ; ex affinitate *D. daunaeae* differt foliis hastato-cordatis brevioribus, inflorescentiis foemineis rigidis, capsulis majoribus.

Partes inferiores ignoti. *Caulis* inermis, laevis, glaber, sinistrorsum volubilis. *Folia* alterna, hastato-cordata, breviter acuminata, ad 9 cm. longa, ad 9 cm. lata medio parte, 7-nervia : areola intranervia interior clausa late oblanceolata : areola a nervorum paribus alteris amplexa subrotunda : pagina superior glabra, nervis omnibus distinctis : pagina inferior glabra, nervis primariis exstantibus, reti distincto : petiolus ad 9 cm. longus, glaber. *Racemi masculi* vel axillares vel in inflorescentiam longam terminalem dispositi, si axillares vel solitarii vel 2-nati vel 3-nati, ad 12 cm. longi, 20-50-flori, dependentes : flores pedicellati, respicientes : pedicelli 1 mm. longi, bracteolati : bractae anguste lanceolatae : bracteolae

similes, minores. *Perianthii masculi* laciniae in tubo infundibuliformi connatae, subsimiles, longe-ovatae, subacutae, 1-nerviae. *Stamina* 6, incurvata. *Flores foeminei* pedicellati, in racemis rigidis solitariis ex axillis foliorum versus stirpem porrectis, 10 cm. longis : axis 1.5 mm. diametro, alatus : pedicelli decurvati, 4-5 mm. longi. *Sepala* lanceolata, dorso subcristata, 2 mm. longa. *Petala* similia. *Staminodia* 6, perparva. *Capsulae* magnae, obcordatae : pedicellus antea floris capsula jam matura incrassatus, curvatus, apicem versus ampliatus, 2.5-3 cm. longus : alae ad placentas 4 cm. longae, oblique ex pedicello ad marginem 6 cm., etiam 3.5 cm. latae. *Semina* circumcirca alata.

SUMATRA. Asahan, ad Bandar Poeloeh, in silvis, Yates 2055 ! (type ♂) ; Sineloengoen, inter Djoema Tombak et Taratak, Bartlett 8200 ! (type ♀).

XV.—THE BOTANICAL NAME OF "TARA."

T. A. SPRAGUE.

"Tara" is one of three American species of *Caesalpinia* the pods of which are used in tanning, the other two being "Divi-divi," *C. coriaria* (Jacq.) Willd., and "Algarobilla," *C. brevifolia* (Clos) Baill.* It is a shrub or small tree rather widely distributed in tropical America, and has been re-described several times under different names, the ones most commonly employed in recent literature being *Caesalpinia tinctoria* (H.B.K.) Taub. and *Caesalpinia pectinata* Cav. Under International Rules, however, the correct name for the species is *Caesalpinia spinosa* (Mol.) Kuntze.

The earliest mention of "Tara" seems to be in Feuillée's journal† of his observations on the coast of South America and in the West Indies, during the years 1707-1712. Feuillée gave what was, for the time at which he wrote, a fairly good botanical description and figure of "Tara," in which, however, the filaments were described as five in number instead of ten, and the leaflets were taken for leaves.

According to Feuillée, "Tara" is a shrub reaching a height of more than 12 ft., found in the valley of Lima. He mentions that the lower sepal is much longer than the four others and that it has a denticulate margin, a character which is shown also in his figure. The pods were used by the dyers for obtaining a black dye, and Feuillée relates that he used to make a beautiful black ink by boiling them with a small quantity of alum.

The name *Poinciana spinosa* was adopted by Molina in the first edition of his "Saggio sulla storia naturale del Chile," 158 (1782), accompanied by a reference in a footnote to "Poinciana spinosa, vulgo Tara Feuil." In the second edition (1810) of his "Saggio," however, Molina changed the name of the species to *Tara tinctoria* Mol., *Tara* being a proposed new genus of Pentandria Monogynia. In the meantime, the same species had been described under the name

* Chevalier in Rev. Bot. Appl. ix. 300 (1929).

† Feuillée, Journ. Obs. ii. 752, t: 39 (1714).

Caesalpinia pectinata by Cavanilles* in 1802 from a shrub 5-7 ft. high grown in the Royal Garden at Madrid, which flowered for the first time in July of that year. According to Cavanilles, *C. pectinata* was a native of Nueva España (New Spain), a geographical expression which then included, in a wide sense, parts of Central America and the West Indies, in addition to Mexico, to which it was applied in a more restricted sense. The work in which *C. pectinata* was described by Cavanilles must, in its original edition, have had a very limited circulation—it was apparently unknown to De Candolle, who published a new description of *C. pectinata* in 1813† without citing that of Cavanilles. The specific epithet *pectinata* referred to the pectinate margin of the lower sepal.

An excellent illustration of “Tara” under the name *Caesalpinia Tara* appeared in Ruiz et Pav. Fl. Peruv. iv. t. 374, issued in 1802.

In 1810 Molina, as mentioned above, proposed the name *Tara tinctoria* for “Tara,” which he regarded as the type of a new genus of Pentandria Monogynia. He mentioned that it occurred at Valparaíso as well as in Peru, but does not appear to have re-examined the species, his description being based on that of Feuillée and including the same erroneous statements as to number of stamens and the arrangement of the leaves.

In 1824 Kunth‡ based a new genus *Coulteria* H.B.K. on material gathered by Humboldt and Bonpland at Cartago in Columbia. This included two species, *C. horrida* H.B.K. and *C. tinctoria* H.B.K., which are now considered to be spiny and unarmed states respectively of the same species. Kunth cited *Caesalpinia pectinata* Cav. and *Caesalpinia tinctoria* Domb. mss. as synonyms of *Coulteria tinctoria*, but his main description of that species was drawn up from Humboldt's material and notes, so that the type of the name *Coulteria tinctoria* is the Cartago specimen. He added a short description of Dombey's Peruvian specimens, confined chiefly to the legume and seeds, which were unrepresented in Humboldt's material. According to Humboldt, *C. tinctoria* was known in Colombia under the vernacular names “Dividivi” and “Bresil.”

The last name given to the species was *Caesalpinia spinosa* (Mol.) Kuntze, § a new combination based on *Poinciana spinosa* Mol.

Examination of the material in the Herbaria at Kew and the British Museum confirms the view now generally adopted that *Caesalpinia spinosa* of Peru, *C. horrida* and *C. tinctoria* of Colombia, and *C. pectinata* from “Nova Hispania” represent forms of the same species. The “Tara” of Peru is consistently described as a shrub by Weberbauer,|| but according to O. F. Cook** it grows into a tree

* Cav. Descr. Pl. 467 (1802).

† DC. Cat. Pl. Hort. Bot. Monspel. 13, 84 (1813).

‡ H.B.K. Nov. Gen. vi. 329.

§ Kuntze, Rev. Gen. iii. pars 2, 54 (1898).

|| Engl. & Drude, Veg. der Erde, xii. 93, 143 etc. (1911).

** U.S. Dept. Agric. Bur. Pl. Industry, Invent. Seeds & Plants Imported, no. 45, 12 (1918).

20-30 ft. in height in the valley of Urubamba, Peru. At Huanuco, Peru, the species is also a tree of 20-30 ft., according to Pearce (Herb. Kew.), and at Ambato and Riobamba in Ecuador, it attains the same height, according to Spruce (Herb. Kew.). In the dry climate of Cartago, Colombia, where it is known as "Divi-divi" or "Bresil," it is described by Humboldt as a shrub 12-24 ft. high ("Frutex 2-4-oryalis.").

The species has been recorded from Chile, Peru, Bolivia, Ecuador, Colombia, Venezuela and Cuba, but in Chile it does not appear to be native. C. Gay* mentioned it as being cultivated in gardens, particularly in the north of Chile, and suggested that it had been introduced from the province of San Juan, Argentina. Reiche† states that it is either indigenous or introduced from Argentina. There appears to be no actual record, however, of the occurrence of "Tara" in the Argentine Republic, and it is not included by Hieronymus‡ in his account of the useful plants of that country. No information is available as to whether the species is actually a native of Cuba or is merely cultivated or naturalized there. In Peru, Bolivia, Ecuador, Colombia and Venezuela, it appears to be indigenous, although it is also cultivated in those countries.

The question of the correct name, under International Rules, of the species concerned is not quite so simple as it might seem. Molina (vide supra) employed the binary name *Poinciana spinosa* in the first edition of his "Saggio," with a reference to *Poinciana spinosa vulgo Tara* Feuillée, which had been published with a description (Feuill. Journ. Obs. ii. 752: 1714). But the fact that *Poinciana spinosa* appears in Roman characters in Molina's book, whereas the botanical names of all the other plants mentioned by him are in italics, might give rise to a suspicion that Molina merely used the name proposed by Feuillée without regarding it as a proper botanical name. On the other hand, if Molina in 1782 did not regard the plant as a species of *Poinciana*, and accept the name *Poinciana spinosa* for it, there was no need for him to mention it in the text of his book. He might simply have stated that the pods of the "Tara" were used for making ink. Presumably the printing of the name in Roman characters was due to a typographical error. Actually, the name was published in 1782 by Molina with a reference to a previously published description, and unless and until it can be shown that Molina did *not* accept it at that date, the specific epithet will stand. The fact that twenty-eight years later he changed the name to *Tara tinctoria* Mol. is immaterial in this connection. At that date (1810), and indeed for many decades later, it was not considered necessary to retain the original specific epithet when transferring a species from one genus to another. Hence *Poinciana spinosa* Mol. (1782) may be regarded as having been effectively published.

* Fl. Chil. ii. 222 (1846).

† Flora de Chile, ii. 49 (1897).

‡ Pl. Diaphor. Fl. Argent. (1882).

The next question which arises is that of the genus to which it should be assigned. The writer accepts the genus *Caesalpinia* as defined by Bentham* and adopted by Taubert,† and fails to see that any useful purpose is served by restoring Bentham's Sections of *Caesalpinia* to generic rank. Under *Caesalpinia* the correct name for "Tara" is *Caesalpinia spinosa* (Mol.) Kuntze; if, however, *Caesalpinia* Sect. *Coulteria* (H.B.K.) Benth. is treated as an independent genus, it must bear the generic name *Tara* Mol. (1810), not *Coulteria* H.B.K. (1824), and the species becomes *Tara spinosa* (Mol.) Britton et Rose.‡

An account of the synonymy, principal illustrations, vernacular names, uses and geographical distribution of *Caesalpinia spinosa* follows. Except where otherwise indicated, the specimens cited are in the Kew Herbarium.

***Caesalpinia spinosa* (Mol.) Kuntze**, Rev. Gen. iii. pars 2, 54 (1898). *Poinciana spinosa* Mol. Saggio, ed. 1, 158 (1782).

Caesalpinia pectinata Cav. Descr. Pl. 467 (1802); DC. Cat. Pl. Hort. Monsp. 13, 84 (1813); Turp. in Dict. Sc. Nat., Planch. Bot. Dicot. t. 257 (1816-20); Spreng. Syst. iv. Cur. Post. 160 (1827); Britton in Bull. Torr. Bot. Club, xvi. 325 (1889); Urb. Symb. Antill. ii. 285 (1900); O. F. Cook in U.S. Dept. Agric., Bur. Pl. Industry, Invent. Seeds & Plants Imported, No. 45, 12, 16, t. 1 (1918); Standley in Contrib. U.S. Nat. Herb. xxiii. 424 (1922), in obs.; Chevalier in Rev. Bot. Appl. ix. 301 (1929).

Caesalpinia Tara Ruiz et Pav. Fl. Peruv. iv. t. 374 (1802); Haenke, Introd. Hist. Nat. Prov. Cochabamba, 92 (1900).

Tara tinctoria Mol. Saggio, ed. 2, 153 (1810); Schult. Syst. v. 407 (1819).

Caesalpinia mucronata Willd. Enum. Hort. Berol. i. 444 (1809), fide Urb. Symb. Antill. ii. 285 (1900).

Coulteria tinctoria H.B.K. Nov. Gen. vi. 331, t. 569 (1824); DC. in DC. Prodr. ii. 481 (1825); G. Don, Gen. Syst. ii. 420 (1832); Hook. et Arn. Bot. Beech. Voy. 55 (1832); et in Hook. Bot. Misc. iii. 207 (1833); Spach, Hist. Nat. Veg. Phan. i. 100 (1834); et Atlas, t. 2 (1846); Walp. in Flora, xxi. pars 1, 36, t. 1 (1838); Gay, Fl. Chil. ii. 222 (1846); Ralph, Ic. Carpol. 17, t. 22, fig. 3 (1849); Griseb. Cat. Pl. Cub. 78 (1866); Cortés, Flora de Colombia, 209, 224 (1897); Pittier, Plantas Usuales de Venezuela, 216 (1926).

Coulteria horrida H. B. K. Nov. Gen. vi. 330, t. 568 (1824); DC. l.c.; G. Don, l.c.; Walp. l.c. t. 1, fig. 3; Spach, l.c. i. 100; Ralph, l.c. 16, fig. 4; M. Micheli in Journ. de Bot. vi. 192 (1892).

Coulteria chilensis DC. in DC. Prodr. ii. 481 (1825).

Caesalpinia tinctoria Domb. ex DC. l.c. (pro. syn. *Coulteriae tinctoriae*); Royal Gardens, Kew, Guide Mus. Econ. Bot., no. 1, 54 (1883); Lubbock, Seedlings, i. 456, fig. 297 (1892).

* Benth. & Hook. f., Gen. Pl. i. 565 (1865).

† Engl. & Prantl, Nat. Pflanzenf. iii. Abt. 3, 173 (1892).

‡ Britton & Rose in N. Am. Fl. xxiii. 318-341 (1930).

Poinciana Tara Ruiz et Pav. ex DC. Prodr. ii. 481 (1825), pro syn.; Peña, Flora Cruceña, 237 (1901).

Caesalpinia tinctoria (H.B.K.) Taubert in Engl. & Prantl, Nat. Pflanzenf. iii. Abt. 3, 175 (1892); Reiche, Fl. Chile, ii. 49 (1898); Weberbauer in Engl. & Drude, Veg. der Erde, xii. 158, f. 16 (1911); Pittier in Bol. Ci. Teen. Mus. Com. Venez. i. 58 (1926); Knuth in Fedde, Repert., Beih. xliii. 381 (1927).

Tara spinosa (Mol.) Britton & Rose in N. Am. Fl. xxiii. 320 (1930). *Poinciana spinosa*, vulgo *Tara* Feuillée, Journ. Obs. 2, 752, t. 39 (1714).

ILLUSTRATIONS. Feuillée, Journ. Obs. ii. t. 39 (1714), as *Poinciana spinosa*; Ruiz et Pav. Fl. Peruv. iv. t. 374 (1802), as *Caesalpinia Tara*; H.B.K. Nov. Gen. t. 568 (1824), as *Coulleria horrida*; H.B.K. L.c. t. 569, as *Coulleria tinctoria*; U.S. Dept. Agric., Bur. Pl. Industry Invent. Seeds & Plants Imported, No. 45, t. 1 (1918), as *Caesalpinia pectinata*.

VERNACULAR NAMES. "Tara" (Chile, Peru, Bolivia), "Guaranga" (Ecuador), "Guarango" (Colombia: Antioquia), "Dividivi" (Colombia: Cauca, Cundinamarca, Santander), "Dividivi de los Andes" (Venezuela).

USES. The pods are used in tanning. (Chevalier in Rev. Bot. Appl. ix. 301, 380: 1929.) According to O. F. Cook, "Tara" pods are a regular article of trade in the market at Lima, and are said to be used for dyeing, tanning leather, and making ink. He also states that "Tara" is often planted for hedges in Peru, especially in the district round the town of Urubamba, a well-grown hedge of it keeping out cattle, pigs or goats, as well as human intruders (U.S. Dept. Agric., Bur. Pl. Industry, Invent. Seeds & Plants Imported, No. 45, 12: 1918).

CHILE. Cultivated in gardens at Valparaiso, *Bridges* 96 (vide Hook. & Arn. Bot. Beech. Voy. 55); near Valparaiso, *Macrae*. Prov. Tarapaca: Pica, 1100 m., *Werdermann* 752. Tacna, *Rusby* 2358. "Cobija, Iquique and Arica," *Cuming* 936.

PERU. Lima, in dry sandy places, *Nation*. Valley of Lima and Pachacamac, *A.M.* 442. Huanuco, *Pearce* 58. Without locality *Herb. Pavon* (Mus. Brit.). Urubamba valley, between Ollantaytambo and Torontoy, 2400-3000 m., very abundant in a wild state, also planted, especially around the town of Urubamba (ex O. F. Cook, l.c.).

BOLIVIA. Near Sorata, 2650 m., *Mandon* 749. Songo, *Bang* 824. Coroico, in a garden, *Pearce* (Mus. Brit.). Santa Rosa, 3000 m., cultivated (ex Kuntze, l.c.).

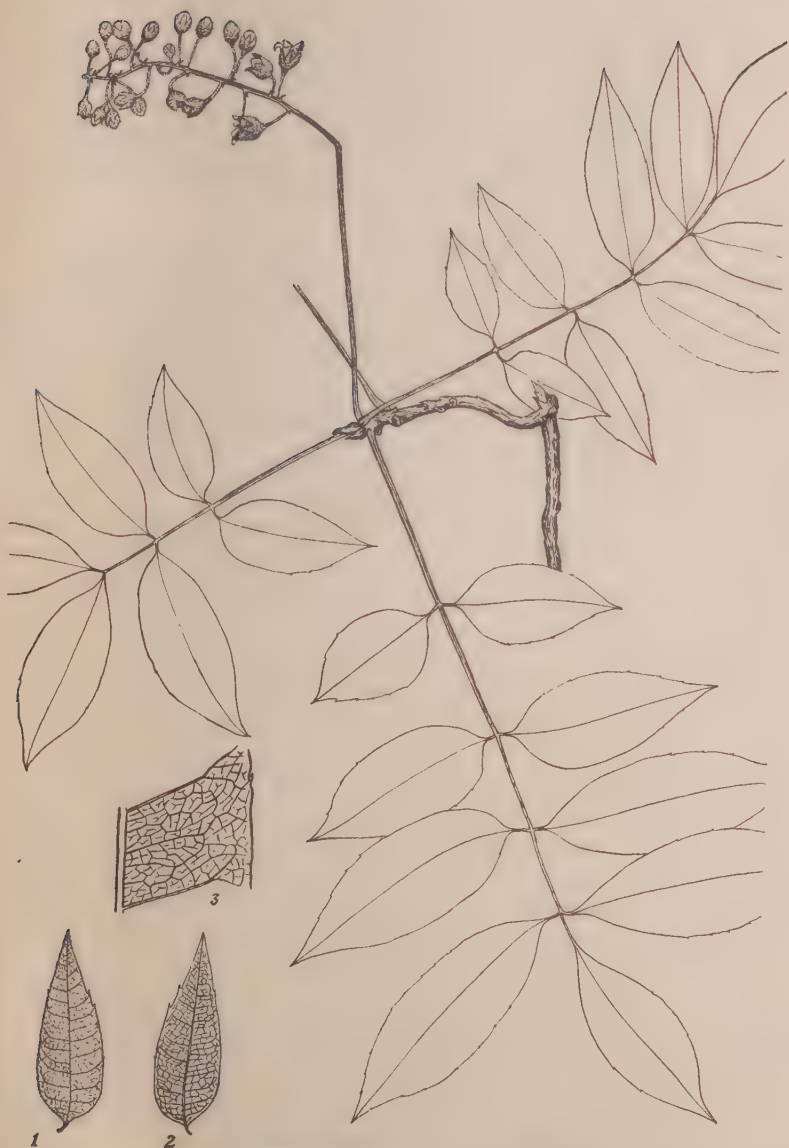
ECUADOR. Baños, *Spruce*. Ambato, Riobamba etc., *Spruce* 5315. Loja, *Seemann* 749. In dry sandy valley of the Rio Chota, Imbabura, 1500-2200 m., *Lehmann* 4788. By the banks of the Rio Chota, *André* 3561. Valleys of the Andes, 1800-2400 m., *Jameson* 821.

COLOMBIA. Cauca : Cartago, 900 m. (ex H.B.K. l.c.). Antioquia, 1300 m., *Jervise*. Cundinamarca : garden in Bogota, *Mrs. Tracey* 303 ; Cáqueza, 2000 m. *Triana* 465 (4370) (Mus. Brit.) ; Chipaque, 1500-2000 m., *Lehmann* 8764. Without locality, *Dawe* 378. VENEZUELA. Merida : in subalpine places, *Moritz* 1455. Los Andes : Páramo del Molino, 2200 m., *Jahn* 924 (ex Knuth, l.c.) CUBA. Without locality, *Wright* 2363.

XVI.—DECADES KEWENSES PLANTARUM NOVARUM IN HERBARIO HORTI REGII CONSERVATARUM. DECAS CXXVI.

1251. **Bersama rosea** *Hoyle* [Melianthaceae] ; *B. abyssinicae* Fresen. affinis sed ramulis novellis glabris roseo-brunneis, rhachide angustiore, foliolis utrinque fortius reticulatis et subtus lucentibus, inflorescentia laxa rosea, pedicellis longioribus gracilibusque, distincta.

Frutex parvus ; ramulis novellis fortiter striatis, roseo-brunneis, glabris ; cortice canescente, fortiter striato. *Foliis* prope apices ramulorum confertiusculis, imparipinnatis, raro abortu paripinnatis ; stipulis interpetiolaribus, 5 mm. longis latisque vel majoribus, late ovatis, rigide coriaceis, ciliatis, petioli basim amplexantibus et intra eundem connatis ; petiolo 4-9 cm. longo, gracili, basi tumido, sursum terete, supra canaliculato, glabro ; rhachide 3.5-18.5 cm. longo, terete, non alato, gracili, supra canaliculato et praeter floccos longorum pilorum inter petiolulorum juga glabro ; foliolis 3-6 jugis superioribus oppositis, 1 vel 2 jugis infimis sub-oppositis, jugis plerumque 2-3 cm. separatis ; petiolulis usque ad 4 mm. longis, gracilibus, supra fortiter canaliculatis, glabris, infimis saepe reflexis, petiolulo folioli ultimi 9-12 mm. longo, gracillimo ; foliolis 3.3-8.5 cm. longis, 1.7-4.2 cm. latis, ovatis usque ad elliptico-vel oblongo-lanceolatis, superis angustioribus ; foliolis basi cuneatis, leviter decurrentibus, apice acute acuminatis cum gracili mucrone (usque ad 3 mm. longo) ; margine integerrimo vel repando, vel paulum distanter crenato-serrato ; foliolis utrinque glabris praeter paucos pilos longos subtus in costa, supra fusco-viridibus, subtus lucentibus et tenuiter reticulatis, costa supra paulum impressa subtus prominente ; nervis lateralibus 8-13. *Inflorescentiis* laxis, racemosis, longipedunculatis, singulis in axillis foliorum summorum vel superiorum ; pedunculo usque ad 10 cm. longo, gracili, fortiter striato, infra glabro, rhachide et pedunculi apice crispis pilis roseo-brunneis hirsuto ; pedicellis in genere longiusculis, 6-10 mm. longis, gracilibus, roseo-brunneo-tomentosis, solitariis in axillis bractearum ; bracteis brunneo-tomentosis, usque ad 3 mm. longis ; alabastris oblongo-ovoideis ; floribus cernuis, 1 cm. longis, 1.5 cm. latis. *Calyce* extus dense tomentoso, intus glabro, sepalis extus in medio longitudinaliter brunneo, prope marginem roseo- (Tyrio-) tomentosis ; sepalis 4-5 mm. longis, 2.5-3.5 mm. latis, basi breviter connatis, ovatis usque ad ovatis-lanceolatis, obtusis, grande sepalo breviter vel paulum profunde in apice incisa. *Petalis* ligulato-spatulatis, 1 cm. longis,



Bersama rosea Hoyle, from type.

1, Upper surface of leaflet, $\frac{1}{2}$ nat. size. 2 Lower surface of leaflet, $\frac{1}{2}$ nat. size. 3, Portion of lower surface of leaflet, $\times 2$.

superne 3 mm. latis, densissime cum roseis (Tyriis) pilis villosotomentosis. *Staminibus* 5; filamentis 4 mm. longis, basi glabris et breviter connatis, in parte libera lanceolatis tomentosis, intra crassum discum concavum et paulum lobatum insertis; thecis amplis, 3 mm. longis, flavis, sparse villosis, oblongis. *Ovario* villosa, 4-5-loculare; stylo crasso, glabro, staminibus vix longiore, stigmate 5-lobato, sub-globoso. *Fructibus* non visis.

TANGANYIKA TERRITORY. Mufindi, an undershrub in temperate rain-forest near the Forest House, 6,000 ft., flowering 12th Nov. 1929, *L. G. T. Wigg* 14! (type, in Herb. Kew.); *Haarer* 1602!

1252. ***Coelidium cymbifolium*** C. A. Sm. [Leguminosae-Genisteae]; affine *C. bullato* Benth., a quo caulium indumento conspicue adpresso argenteo, foliis majoribus longe acuminatis subtus glabris differt.

Radix crassissima, lignosa, basi usque 1.5 cm. crassa, deorsum sensim attenuata. *Caules* numerosi, erecto-adscendentes, usque 18 cm. longi, simplices vel ramosi, inferne nudi, superne foliati, indumento arcte adpresso argenteo-sericeo (pilis infra bases foliorum patulis), inferne glabrati. *Folia* anguste cymbiformia, marginibus inflexis, ambitu (explanata) ovata, usque 1.5 cm. longa et 4 mm. lata, coriacea, in apicem longe acuminata, basi dilatata, plus minusve amplexicaulia, longe ciliata, supra densissime adpresse sericeo-villosa, subtus ecarinata, glabra. *Inflorescentia* strobiliformis, circiter 3 cm. longa et 2 cm. diametro. *Flores* sessiles, bini in axillis bractearum foliacearum vel, si mavis, foliorum superiorum; bracteae propriae florum valde reductae, subulatae, villosae. *Calycis* *tubus* campanulatus, usque 4 mm. longus, extra dense sericeo-villosus, intus nitidus, glaber; dentes subaequales, subulati, usque 5 mm. longi, longe ciliati, utrinque dense sericeo-villosi. *Petala* libera, longe unguiculata, glabra; vexillum oblongo-ellipticum, usque 6 mm. longum et 4 mm. latum, longitudinaliter plicatum; alae oblongae, usque 5.5 mm. longae et 1.5 mm. latae, obtusae; carinae petala plus minusve oblique falcata, usque 4.5 mm. longa et 1.5 mm. lata. *Filamenta* dimidio inferiore connata; *tubus* staminalis postice fissus, sed basi annulo ovarium circumambiente instructus. *Ovarium* dense sericeo-villosum, 1-ovulatum; *stylus* crassiusculus, leviter incurvus, triente superiore excepta longe sericeo-pilosus. *Legumen* ignotum.

SOUTH AFRICA. Riversdale Div.: on the north side of the Langebergen, Sept.-Oct. 1929, *Muir* 4510 (type in Nat. Herb. Pretoria).

The name *Coelidium parvifolium* Druce (in Rep. B. E. C. Brit. Isles, 1916, 616: 1917) must be rejected under International Rules in favour of *C. Thunbergii* Harv. As a new combination, *Coelidium parvifolium* Druce is invalid, since it was based on an invalid name, *Crotalaria parvifolia* Thunb. (1800) non Roth (1797). As a new name for the species concerned, it is long antedated by *Coelidium Thunbergii* Harv.

1253. **Dissothis (Heterotis) mirabilis** *Bullock* Melastomaceae-Osbeckieae]; *D. cryptanthae* Baker affinis sed floribus majoribus paucioribus, foliis multo majoribus differt.

Frutex 0.5-2 m. altus; caules subtetragoni vel subteretes, junioribus dense ferrugineo-pubescentibus. *Folia* opposita, integra, lanceolata vel anguste oblonga, 2.5-6 cm. longa, 1-1.5 cm. lata, e basi truncata usque ad apicem subacutum 5-7-nervia; pagina superiore rigide scabrido-pubescente, nervis impressis, pagina inferiore molliter ferrugineo-pubescente, nervis valde prominentibus scabrido-pubescentibus; petioli 2-4 mm. longi, ferrugineo-pubescentes. *Flores* magni, terminales solitarii vel in cymas paucifloras dispositi; bracteolae 5-8, calyci adpressae, involucrum foliaceum efformantes, ovatae usque ovato-lanceolatae, 2-3.5 cm. longae, circiter 1.5 cm. latae, margines versus membranaceae, nervis e basi compluribus vix prominulis. *Calyx* extra dense adpresso-sericeo-villosus, intus glaber; tubus cupularis, circiter 1.3 cm. longus, 1 cm. diametro; lobi 3-seriati, seriebus exterioribus subimbricatis, lobis circiter 10 semiorbicularibus vel semiellipticis 2-4 mm. longis persistentibus, serie intima 5-loba, segmentis lanceolatis subacutis 1.5-1.8 cm. longis 4 mm. latis caducis, sinibus latis. *Corolla* lilacino-purpurea, mox caduca; petala 5, inaequalia, contorta, obovata, petalo maximo plus quam 4 cm. longo et 2.7 cm. lato, limbo late rotundato in unguem brevem decurrente. *Stamina* 10, per paria disposita; filamenta circiter 1.3 cm. longa, recta; thecae 1-1.2 cm. longae vel ultra; connectivum unius cujusque paris staminum infra thecas usque 2.5 cm. productum, valde incurvum, appendicibus 2 caudiformibus 5 mm. longis; connectivum alterius staminis basi tantum 2-3 mm. productum, infra ipsas thecas abrupte incurvatum, caudis similibus. *Ovarium* 5-loculare, ellipsoideum, 1 cm. longum, parte inferiore tubo calycino adnatum, parte superiore libera, dense longo-pilosa; stylus glaber, usque 3 cm. longus, curvatus, stigmate truncato. *Capsula* in tubo calycino leviter accrescente inclusa, 1.2 cm. longa.

UGANDA. Katera, in the swamp-lands in Minziro Forest, May, *Brasnett* 22 (type); Bombo Road, Feb., *Lankester* s.n.; Kampala, 3900 ft., Nov., *Mailland* 549; without precise locality, *Mailland* 42AB; Buddu etc., Mar., *Scott Elliot* 3174, 7240, 7480; without precise locality, *Wilson* 137; Entebbe, about 10 miles from the lake, *Fyffe* 206.

A very handsome shrub 2-6 ft. high, with short-lived, sweet-scented, purple-mauve flowers. The plant grows in very striking groups in swampy country, always near surface water.

1254. **Begonia hypolipara** *Sandwith* [Begoniaceae]; species e Sect. *Magnusia* (Klotzsch) Irmsch., Subsect. *Rachia* (Klotzsch) Irmsch., a *B. incana* Lindl. atque *B. polygonata* Liebm. foliis haud peltatis, a *B. lanuginosa* DC. petiolis foliis scapisque haud lanuginosis differt.

Herba acaulescens, rhizomate crasso setifero 1.5 cm. diametro. *Stipulae* scariosae, brunneo-striatae, triangulari-lanceolatae, ad 2 cm. longae. *Folia* reniformia, rotundata, margine subsinuata vix angulata, apice obtuso nonnunquam apparente, basi profunde cordata lobis rotundatis magis conspicue dentatis, 7-13 cm. longa, 9-15.5 cm. lata, subcarnosa, utrinque satis dense molliter sed inconspicue adpresse pilosa, subtus pernitentia et conspicue palmatinervia nervis 7-9, haud peltata; petiolus pilosus, 8-19 cm. longus, 3-8 mm. diametro. *Scapi* ad 25 cm. longi, 2.5 mm. diametro, satis inconspicue pilosi. *Inflorescentia mascula* ter ramosa, 6 cm. lata, floribus pedicellisque albis, pedunculi primarii virides, pilosi, 1-1.5 cm. longi; pedicellus floris intermedii albus, pilosus, 3 cm. longus; pedicelli sparse pilosi, ad 1.5 cm. longi; bracteae delapsae; bracteolae sparse pilosae atque ciliatae, obovatae vel obovato-oblongae, 4-7 mm. longae, 2-3 mm. latae; sepala 2, glabra, fere orbicularia vel late obovata, 1-1.2 cm. longa, ad 1.2 cm. lata; petala nulla, vel raro petalum unum parvum, obovato-lineare, 8 mm. longum, 2.5 mm. latum; stamina libera, 2-3 mm. longa, antheris filamenta aequantibus vel eis paullo brevioribus. *Inflorescentia feminea* 9 cm. lata, bis ramosa, cymulis trifloris; pedunculi virides, pilosi, ad 1.5 cm. longi; pedicelli albo-virides, pilosi, 0.7-1.7 cm. longi; bracteae delapsae; bracteolae ovario arcte adpressae, orbiculares, conspicue regulariter fimbriatae atque ciliatae, ceterum glabrae vel sparse pilosae, albo-virides, florem minutum sessilem saepe obtegentes, 6-9 mm. longae, 0.6-1.2 cm. latae; sepala 2, alba, glabra, fere orbicularia, 1.2-1.3 cm. longa, circiter 1.4 cm. lata; petalum semper 1, album, anguste obovatum, obovato-oblongum vel fere spathulatum, 0.9-1.2 cm. longum, 4-6 mm. latum; styli 3, flavo-virides, laciniis spiralter papillosis; ovarium albo-viride, inaequaliter 3-alatum, glabrum, 9-10 mm. longum atque diametro, ala maxima 7-10 mm. lata, secunda 2-3 mm. lata, tertia inconspicua; placentae 2-partitae, lamellis utrinque ovuliferis.

HONDURAS. San Pedro, comm. *G. Catt*, fl. in Hort. Kew., March 1930 (type in Herb. Kew.).

1255. ***Eriocephalus aromaticus*** C. A. Sm. [Compositae-Anthemideae]; *E. punctulato* DC. et *E. tenuifolia* DC. affinis, ab illa ramulis foliosis semper oppositis valde abbreviatis axillis arachnoideo-lanuginosis, ab hac foliis multo brevioribus configuratione aliena distincta.

Frutex parvus, rigide erectus, ramosissimus, dumosus, usque 60 cm. (vel ultra) altus. *Rami* robusti, nudi, cortice rugoso striato fusco, tandem valde (plerumque dicho- vel trichotome) ramosi, hinc inde parce tenuiter hirsuto-lanuginosi vel arachnoidei; ramuli ultimi erecti, graciles, nudi, paria 6-10 ramorum foliosorum valde abbreviatorum ferentes, internodiis usque 2.5 cm. longis, rubro-brunnei, laeves, levissime striati vel tenuiter granuloso-puberuli, sub quoque pari ramorum lateralium plerumque lanuginoso-hirsuti. *Folia* opposita, decussata, imbricata, oblonga usque oblongo-

linearia, e basi lata amplexante orta, apice obtusa mucronulata, pagina superiore plano-convexa basin versus leviter depressa, pagina inferiore (exteriore) manifeste convexa, usque 8 mm. longa et 1 mm. diametro, margine integro albo, jam viventia dense punctata et aromatica, praeter axillas lanuginosas glabra; folia basin pedunculorum involucrentia densissime conferta, pagina inferiore rotundato-convexa, pagina superiore profunde sulcata. *Pedunculi* 3-5 ad apicem ramulorum subumbellatim dispositi, graciles, foliis usque duplo longiores, tenuiter puberuli, basin versus et infra capitula albo-lanuginoso-hirsuti. *Capitula* circiter 18-flora. *Involucrum* 3-4-seriatum; bracteae extimae 2, oppositae, ovato-suborbiculares, intus valde concavae, dorso rotundato-convexae, carina glanduloso-punctatae, ceterum glabrae, margine latissimo integro scarioso; exteriores 2-3, praecedentibus similes, sed latiores, minus conspicue carinatae; interiores 2-3, suborbiculares, apice rotundatae, incrassatae, firmae, dorso pilis longis undulatis dense lanuginosae, intus glabrae; intimae 6-7, suboblongae, praecedentibus tenuiores et multo minores, dorso vel omnino lanuginosae vel tantum apice villosae. *Flosculi radii* ♀, 2-3, 1-seriati, longe exserti, lamina alba cuneiformi profunde grosse 3-dentata pagina inferiore glanduloso-punctulata; achaenia fertilia, compresso-obovoidea, pilis lanuginosis oblecta. *Flosculi disci* ♂, circiter 15, in lana laxa involuti; corolla superne purpurea et glanduloso-punctulata; achaenia sterilia.

SOUTH AFRICA. Laingsburg Div.: slopes of the Witteberg, 975 m., Oct., *Compton* 2681 (type, Herb. Kew.; Bolus). Sutherland Div.: in a kloof at Stompiesfontein, in the Zwartruggens, 1100 m., Sept., *Mrs. Levyns* 1879A!

1256. **Eriocephalus tenuipes** C. A. Sm. [Compositae-Anthemideae]; affinis *E. punctulato* DC., a quo indumento tenuiter argenteo foliorum facile distinguitur.

Frutex parvus, erectus, dumosus, usque 60 cm. altus. *Rami* alterni, cortice nigrescente tenui ei *Elytropappi rhinocerotis* simili tecti, ramosissimi, nudi, tantum foliosi secus ramulos ultimos tenuiter puberulos. *Folia* more sectionis *Phaenogynis* disposita, linearia vel oblongo-linearia, basin versus subangustata, apice rotundata, usque 2 cm. longa et 1 mm. lata, succulenta, integra, pagina superiore plana inferiore valde convexa, plus minus minute punctulata, pilis brevibus sericeis vestita, tandem glabrescentia. *Pedunculi* 2-6 ad apices ramulorum ultimarum subumbellatim aggregati, graciles, folia multo excedentes, tenuiter sericeo-pubescentes. *Involucrum* 2-seriatum; bracteae exteriores 4-5, elliptico-oblongae usque ovatae, obtusae, basibus latis, discretae, medio saturate virides, late scarioso-marginatae, extra manifeste pubescentes; bracteae interiores plus minus basi concretae, firmae, corneae, extra dense lanuginosae, intus glabrae. *Flosculi radii* ♀, 2-3, 1-seriati, lamina alba longe exserta suborbiculari integra vel apice obtuse et grosse 3-dentata; achaenia fertilia, anguste compresso-obovoidea, fertilia, sordide

alba, tenuiter et laxe lanato-pilosa. *Flosculi disci* ♂, circiter 10, in lana laxa involuti; corolla superne purpurea; achaenia sterilia.

SOUTH AFRICA. Uniondale Div.: in Lang Kloof, near Haarlem, 760 m., May, *Fourcade* 1334 (type, Herb. Kew.; *Fourcade*).

1257. **Cyphocarpus innocuus** *Sandwith* [Campanulaceae-Cyphieae]; *C. rigescenti* Miers affinis, foliorum dentibus inconspicuis paucioribus haud pungentibus, foliis radicalibus lineari-spathulatis, lamina a petiolo vix distincta, praesertim laciniis calycinis integerrimis, antheris minoribus elliptico-oblongis differt.

Herba annua, tota scabrido-pilosula, radice simplici ad 1.5 mm. diametro; caules e foliis radicalibus surgentes 1-3, erecti, 5-10 cm. alti. *Folia* radicalia lineari-spathulata, 0.3-2.5 cm. longa, dentibus inclusis ad 4 mm. lata, lamina a petiolo vix distinguenda, apice obtuso, utroque margine dentibus 2-3 triangularibus vel triangulari-subulatis 0.25-1 mm. longis haud pungentibus; folia caulina circum florem quemque terna (quorum 2 sunt bractee) radicalibus similia, magis linearia, ad 2.5 cm. longa, ad 2.5 mm. lata, apice acuto subpungente, dentibus parvis similibus. *Calyx* tubo subcampanulato vel obconico 1-2 mm. longo, apice ad 2.5 mm. lato; laciniae inaequales, lineares, integerrimae, apice acuto subpungente, 0.5-1 cm. longae, ad 1 mm. latae sed saepe dimidio angustiores. *Corolla* extra striato-angulata striis minute scabrido-pilosulis; tubus 5 mm. longus, basi 1 mm. latus, sursum ad 2 mm. latitudinem ampliatus; labium superius facie spathulatum, 5 mm. longum, inferne plicatum atque tubuliforme, tum lamina elliptica 3.5 mm. longa 1.5 mm. lata praeditum; labium inferius lobis 4 obovato-oblongis delicate composite pinnatim venosis 4-5 mm. longis 2 mm. latis, sub sinibus ut in *C. rigescente* gibboso-plicatum. *Stamina* filamentis medio ut in *C. rigescente* barbatis 0.75 mm. longis; antherae elliptico-oblongae, ad 1 mm. tantum longae. *Ovarium* 1-1.5 cm. longum, basi 2-3 mm. latum, sursum sensim angustatum; stylus cum stigmate 6.5 mm. longus. *Capsula* matura non visa.

CHILE. Coquimbo; Andacolla Valley, 3000 ft., October 1927, *Clarence Elliott & W. Balfour Gourlay* 98 (type in Herb. Kew.).

No intermediates have been seen between this plant and *C. rigescens*, and specimens of the latter which exactly correspond in age and size show the distinguishing characters as conspicuously as those which are taller and stouter. The anthers of *C. rigescens* are narrowly linear and 1.5 mm. long.

1258. **Anguloa sagittata** *Summerhayes* [Orchidaceae-Kerosphaerae-Lycasteae]; affinis *A. Goldschmidtianae* Schlechter, a qua floribus minus apertis, labelli lobis lateralibus apice subtruncatis, callo antice levissime retuso, columnae pede latiore, pollinii glandula dorso sagittata differt.

Epiphytica. *Pseudobulbi* anguste ovoidei, compressi, primo biconvexi, demum obtuse 6-angulati, sordide virides, usque 13 cm. longi et 7 cm. lati, apice 3-4-phylli, juventute basi vaginis circiter

5 herbaceis obtusis amplexantibus suprema foliacea. *Folia* oblanceolata, acuta vel breviter acuminata, usque 50 cm. longa et 14 cm. lata, glabra. *Scapus* erectus, robustus, teres, glaber, circiter 15 cm. altus, uniflorus, vaginis 5-6 amplexantibus ovatis subacutis usque 6 cm. longis; bractea basi vaginans, elliptica, valde concava, apice cucullata, acuminata, circiter 6 cm. longa. *Flos* magnus, erectus, ei *A. Ruckeri* Lindl. similis. *Sepalum* intermedium erectum vel incurvum, anguste ellipticum, acutum, apiculatum, 7.5 cm. longum, 4 cm. latum, concavum; sepala lateralia falcato-ovata, acuta, infra medium margine anteriore conspicue ampliata, concava, 6 cm. longa, 4 cm. lata; omnia sepala flavo-viridia, intus densissime rubromaculata, superne rubra. *Petala* oblique ovata, obtusa, acutissime apiculata, 5.5 cm. longa, 3 cm. lata, colore sepalis similia sed maculis minus densis. *Labellum* (explanatum) ambitu fere orbiculare, trilobum, 2.8 cm. longum, 4 cm. latum; lobi laterales erecti, quadrati, e basi labelli 2.5 cm. longi, margine anteriore 7 mm. longi, basi 1.5 cm. lati, apice paulo revoluti leviter undulati velutinopapilloso; lobus intermedius simplex, ovatus, utroque latere erectus, apice revolutus, apiculatus, 1 cm. longus et latus, apice velutinopapilloso, callo obtusato truncato apice levissime retuso glabro 6 mm. longo 5 mm. lato; labellum sordide album, rubromaculatum vel intus basin versus rubro-striatum. *Columnna* erecta vel subreclinata, crassa, 2.5 cm. longa, apice 1.2 cm. lata, supra basin antice incrassata, rubromaculata, pede paulo angustiore curvato. *Anthera* cucullata, antice producta leviter retusa, pallide aurantiaca. *Pollinia* pyriformia, 2.5 mm. longa, intus leviter complanata, flava, in stipitem infra apicem inserta, stipite lineari apice dilatato acuto basi vix attenuato 4 mm. longo, glandulo antice rotundato dorso acute sagittato.

Flowered at the Royal Botanic Gardens, Kew, in July, 1930. Plant received from Mr. T. Hay in 1928, and said to have come from Colombia.

Lip with red bars inside towards the base; spots very dense on sides and thinning out towards apices of the lateral lobes; front lobe with white apex and heavy red spots below; callus with red spots towards the base; outside the lip has scattered red spots towards the base.

1259. **Scirpus Jacobi** C. E. C. Fischer [Cyperaceae-Scirpoideae]; a *S. articulato* Linn., cui peraffinis, statura minore habitu gracili vaginia arte adpressis, glumis suborbicularis rotundatis latioribus quam longioribus, nucula obtuse trigona angulis carina verticali praeditis faciebus convexis transverse valde 8-10-undulato-costatis.

Herba glabra, radicibus fibrosis. *Caules* caespitosi spongiosi teretes acuti intus transverse septati, 7-30 cm. alti, circiter 1.5 mm. diametro. *Folia* 0; vaginae 2, caulem arte amplexantes, inferior circiter 5 mm. longa, superior usque 4 cm. longa, ore obliquo acuto. *Bractee* 0. *Spiculae* sessiles, ovoideae vel ovoideo-oblongae, 5-15 in capitulo globoso laterali ex ore vel paullo supra os vaginae superioris

orto dispositae. *Glumae* membranaceae suborbiculares leviter concavae haud vel obscurissime carinatae, pallide brunneae, 2.5–3 mm. longae et paullo latiores, apice rotundatae interdum minute apiculatae. *Setae hypogynae* 0. *Stamina* 3. *Stylus* nuculo brevior; stigmata 3 stylo aequilonga. *Nucula* obovoidea obtuse trigona, angulis carina verticali praeditis, apiculata, matura nigra, 1–1.25 mm. longa, faciebus plus minus convexis costis validis transversis undulatis 8–10 instructis.

INDIA: without precise locality, Heyne in Wall. Cat. 3458, under the name *Scirpus fistulosus* (type in Wall. Herb. at Kew); Madras Presidency, "Montes Policattensis," Feb., Heyne from Herb. Rottler, in Herb. Kew; Nellore District at Gudur, Feb., K. C. Jacob 18517, in Herb. Madras and Herb. Kew; Coimbatore District at Virumandampalayam, 700 ft., Aug., C. E. C. Fischer 2134, in Herb. Calc.

Mr. K. C. Jacob of the Madras Agricultural College found this plant growing together with *S. articulatus* Linn. in Feb. 1929 in water along the margins of permanent tanks. Recognising it as distinct by its more slender habit and the other characters noted above, he sent it to Kew for comparison. During the preparation of the Flora of the Madras Presidency the other specimens listed above, which had been confused with *S. articulatus* Linn., came to light. In the above description Mr. Jacob's notes have been drawn upon though it is based upon all the specimens cited.

Probably both Heyne's specimens are of the same collection. The hills referred to are those near the Pulicat Lake which falls partly in the Nellore District and partly in the Chingleput District and are not very far from Gudur where Mr. Jacob made his find. Gudur is but little above sea-level; the elevation of Heyne's locality is not known, but it is not likely that the species occurs much higher than the 700 ft. of the Virumandampalayam plant, which was found growing together with *Scirpus supinus* Linn. and is mounted with a plant of that species on one sheet.

1260. **Ascopholis** C. E. C. Fischer, gen. nov. [Cyperaceae].

Inter genera *Mariscum* et *Ascolepidem* medium; ab illo squama utriculari evoluta, ab hoc caulis basi turgida, spiculis 1-floris, ab utroque gluma secunda spathiformi differt.

Spiculae anguste lanceolatae, uniflorae, floribus omnibus hermaproditis. *Glumae* 2, oppositae, subhyalinae, inferiori vacua, altera florifera, spathacea. *Rhachilla* supra glumas 2 vacuas disarticulans, tuberculo gibboso relicto. *Squamella* hypogyna utriculiformis, glumam excedens, subtus integra, supra longitudinaliter aperta florem includens. *Seta* 0 vel unica, brevis. *Stamina* 3; antherae lineares, paullo exsertae. *Stylus* cum ovario continuus, basi haud incrassatus, ramis stigmatosis 2 vel 3 filiformibus. *Nux* squamella inclusa, sessilis, anguste oblonga, plano-convexa vel obtuse subtrigona.—*Herbae*; caules solitarii, basi turgidi, squamis carnosius involuti. *Folia* angusta ad basi caulis conferta. *Spiculae* in spicas

breves oblongas densissimae confertae, terminales, intra bracteas lineares foliaceas valde inaequales sessiles.

Ascopholis Gamblei C. E. C. Fischer—species unica.

Herba erecta, glabra; radicibus fibrosis. *Caulis* solitarius, striatus, basi turgidus, vaginis inferne carnosis albis superne scariosis ferrugineo-punctatis 4–10 cm. longis involutus. *Folia* compluria, supra caulis basin turgidam conferta, filiformia vel anguste linearia, caulem aequantia vel superantia; vaginae membranaceae, ore truncatae. *Spicae* oblongae, circiter 1 cm. longae, 3 usque complures in capitulo denso subgloboso sessiles. *Bracteae* 4, lineares e basi lata, acuminatae, inaequales, minimae circiter 1 cm. longae, maximae circiter 7 cm. longae. *Spiculae* lineares, 1-florae, in rhachillam satis robustam spiraliter insertae, jam delapsae tuberculo parvo interdum marginato relicto. *Glumae* 2, oppositae, hyalinae, punctis ferrugineis plus minus maculatae, venosae gluma inferior abaxialis, oblonga vel lanceolata, acuta, concava, carinata, 2.7–3 mm. longa, vacua; adaxialis spathiformis, 2.5–2.7 mm. longa, rotundata, parte inferiore 0.05–0.08 mm. longa tubulari. *Squama* solitaria, utricularis, 3.5–3.8 mm. longa, facie adaxiali circiter ad medium supra aperta, apice obtusa, venosa, pallide brunnea, punctis ferrugineis saepe maculata, florem includens. *Seta* 0 vel unica, abaxialis, capillaris, alba, levis, ovario multo brevior. *Stamina* 3, adaxialia; antherae lineares, 1.2–1.5 mm. longae, paullo exsertae. *Stylus* cum ovario continuus, 0.75–1 mm. longus; stigmata 2 vel 3, 1–1.5 mm. longa, glabra. *Nux* anguste oblonga, plano-convexa vel obtuse subtrigona, circiter 2.5 mm. longa, fusco-brunnea; cellulae extimae minutae, obtuse hexagonae.

INDIA. Madras Presidency at Ootacamund in the Nilgiri Hills, 7000 ft., June 1884, J. S. Gamble 14279.

XVII.—MISCELLANEOUS NOTES.

MR. GEORGE WILLIAM ROBINSON has been appointed, by the Minister of Agriculture and Fisheries, an Assistant Curator, Royal Botanic Gardens, Kew, in succession to Mr. A. Edwards, who has resigned his position on being appointed Superintendent of Parks, Fleetwood. Mr. Robinson had considerable horticultural experience before the War, and after he was released from military service in 1919 was for two years with the Imperial War Graves Commission in France. He came to Kew as a Student Gardener in 1922 and was promoted Sub-foreman in 1923. On completion of his course at Kew in 1924, he went to Chile and took charge of the gardens of Don Agustin Edwards, Chilean Minister in London, where he was engaged for five years laying out a new estate. In 1929 he was appointed Head Gardener to the London Electric Railways.

CHARLES EDWARD MOSS.—We learn, with great regret, that Professor C. E. Moss died in November last, at Johannesburg, at the age of 58. In him botanical science loses one of the pioneers in the study of plant ecology in the British Empire. Quite early in his career he made his mark as a student of vegetation in the field. Whilst a student at Leeds, Moss had collaborated with the late Dr. W. G. Smith in a study of the vegetation of the West Riding of Yorkshire. Later, when a science master at Taunton, he published an account of the plant-life of a part of Somerset. For these, and other contributions published by the Royal Geographical Society, he was awarded the Society's Back Bequest for 1907 in respect of his "important researches on Geographical Distribution of Vegetation in England." He received his degree of Doctor of Science from the University of Manchester, and from that centre made an intensive study of the Peak District, the results of which were published in book-form under the title "Vegetation of the Peak District." Other important ecological papers including "Xerophily and the Deciduous Habit," "The Fundamental Units of Vegetation," and "The Woodlands of England"—the last with W. M. Rankin and A. G. Tansley—were all published in the *New Phytologist* 1907 to 1910.

In 1906 he went to Cambridge to take charge of the University Herbarium and of the courses in systematic botany. His chief studies there were devoted to the taxonomy of British Plants, and he edited, and largely wrote, the two volumes (II. and III.) of the *Cambridge British Flora* (1914, 1920) which accompanied the only two published volumes of plates by the late E. W. Hunnybun.

When, in 1917, he was appointed Professor of Botany at Johannesburg, he brought with him a wealth of experience not only in the lecture room, but also in herbarium work. His new field of activity was in an extremely rich and practically untouched floral area. Here he soon began to build up a herbarium for his Department, and with this ideal he travelled extensively during the long vacations, covering nearly all parts of the Union of South Africa. His two principal expeditions were an early one in company with his friend the Rev. F. A. Rogers through the Zoutpansberg area, and his last long excursion (1929-30) into S.W. Africa with Mrs. Moss, especially undertaken to collect specimens of *Welwitschia*. So successful was Moss in building up his herbarium that at his death he had accumulated some 20,000 numbers, which places it among the largest of the University herbaria in the Union. It contains a large amount of types of species described in recent years by himself and other botanists—especially among the petaloid Monocotyledons—and a good deal of material critically named by specialists.

Like Dr. Harry Bolus, Moss paid several visits to England, bringing with him large numbers of specimens for critical examination and comparison with type material at Kew and the British Museum, as well as in Continental Herbaria.

Accustomed while in England to the use of an extensive botanical library, Moss found his taxonomic work at Johannesburg severely hampered by the dearth of accessible botanical literature, and with characteristic energy he gradually built up a useful working library at the Botanical Department of the University of Witwatersrand. His success as a teacher of botany was in no small way due to his ability to inspire in his students an enthusiasm for, and active interest in, the subject for its own sake.

Nothoscordum tubiflorum.—*Allium tubiflorum* Rendle in Journ. Bot. vol. xlv. p. 44 (1906), t. 476 C, has the perianth-segments united into a cup-shaped tube at the base, as is indicated by the specific epithet, and belongs accordingly to the genus *Nothoscordum* Kunth. The new combination **Nothoscordum tubiflorum** (Rendle) Stearn is therefore proposed. It is closely related to *Nothoscordum nerineflorum* (Herb.) Benth. et Hook f. (Bot. Reg. xxxiii. t. 5) from which it differs in its smaller habit and blunt reflexed perianth-segments.

W. T. S.

Essential Oils.—Two essential oils of interest have recently been acquired for the Museum Collection—"Mawah" oil from Kenya, and "Pe-Mou" oil from French Indo-China.

Mawah oil is obtained from *Pelargonium graveolens* Ait., a "geranium" native of South Africa, and introduced to Kenya, where approximately 500 acres, centred at Njoro, are under cultivation (Ann. Rep. Dept. Agric., Kenya, 1928). Kew is indebted to the Director of Agriculture, Kenya, and Mr. W. J. Dawson, at Njoro, for information and specimens of the plant; also to Messrs. Lever Bros. Ltd. (Associated Co. Icilma Trading Co., Ltd.), Port Sunlight, for a sample of the oil. As far back as 1914 the characters of "Oil of Geranium" distilled in "British East Africa" were described in the Perfumery and Essential Oil Record (Vol. V. 1914, p. 423). It was regarded as having been distilled from *Pelargonium Radula* var. *quercifolium*?; apparently on the evidence of some leaves which accompanied the sample. A note in the "Chemist and Druggist," July 16, 1927 (p. 98), stated that "an essential oil described as Mawah oil is now being produced in commercial quantities in Kenya from a 'cultivated grass'." An analysis was given, and in general the analysts described "the odour, physical and chemical characters of the plant as somewhat akin to those of a geranium oil." An analysis in the "Oil and Colour Trades Journal" of June, 1928, bears out this view:—"E. J. Parry and G. Ferguson have recently examined some essential oils produced in Kenya Colony, states a contemporary. An oil distilled from plants which are locally known as geraniums—and as "Mawah"—was found to have an odour between that of normal geranium oil and palmarosa oil. Its characters were:—Specific Gravity 0.894 at 15.5°C; Optical Rotation 16.7°; Refractive Index 1.4690 at 20°C; Total Alcohols (as Geraniol)

71 per cent. ; Citronellol 20 per cent. ; Esters (as Geranyl Tiglate) 12.5 per cent.

"A sample of true geranium oil was examined. This was distilled from plants imported three years before from Grasse. Its characters were—Specific Gravity 0.892 at 15.5°C ; Optical Rotation 9° 40 ; Refractive Index 1.4649 at 20°C ; Esters (as Geranyl Tiglate) 30.7 per cent."

The *Pelargonium* specimens from Kenya received for identification at Kew permit it to be safely assumed that these notes refer to one and the same plant (*P. graveolens*). The name "Mawah" was adopted for purposes of trade, from the Swahili word "Maua," the plural form of "Ua" (a flower).

The "Palmarosa" oil referred to above is obtained from a true grass, *Cymbopogon Martini* Stapf, a native of India, the Hindustani name being "Rusa" or "Rosha" ; but in the course of trade the oil has also become known as "East Indian Geranium" and "Turkish Geranium."

"Pe Mou."—This oil is obtained by distillation from the root-wood and stumps (or root-stocks) of *Fokienia Hodginsii* Henry & Thomas (*Cupressus Hodginsii* Dunn), a conifer found in the mountainous parts of Annam and Tongking, in Indo-China, and in Fokien. The tree grows to a height of from 45 to 50 feet, with a girth of 3 feet. Specimens of the wood and oil have been acquired through the kind offices of Mr. F. G. Gorton, His Majesty's Consul-General at Saigon, and the Inspector-General of Agriculture and Forests of French Indo-China. In a letter from the Inspector to the Consul-General, dated Hanoi, 26th July, 1930, it was stated that the production of "Oil of Pe-Mou" was first undertaken at Tongking in 1926 for use in a soap manufactory at Haiphong, and that from 1926 to 1928 it had been exploited in the region of Chapa, whence from 300 to 400 tons of root-wood and stumps had been sent to Messrs. Chiris at Grasse, under whose authority the sample of oil was presented.

M. Gardies has found the principal constituents of essence of "Pe-Mou" to be—Specific Gravity at 20°C., 0.913 ; Optical Rotation +13° ; Refractive Index 1.4937 at 20°C ; Acidity per cent. 0 ; Ester Index 23.14 ; Ester Index after acetylation 188.34 ; Free Alcohol 41 per cent. ; Solubility 1 volume in 3.5 volumes of 70 per cent. alcohol (See l'Agronomie Coloniale, Paris, vi. p. 74, No. 54, March 1922). The odour resembles that of "Cedar Wood oil" distilled from the wood of the "Pencil Cedar" (*Juniperus virginiana* Linn.), which is used here for perfuming soaps. Comparatively little appears to be known of Pe Mou oil in this country and the probability is that all the exports of the material for distillation from Indo-China go to France.

A note on the rarity of the tree under cultivation at home appeared in the *Kew Bulletin*, 1911, p. 328, when a plant from Fokien was presented to Kew by Mr. H. Clinton Baker, Bayfordbury,

Herts. The tree was discovered in the province of Fokien by Captain Hodgins in 1908.

J. H. H.

Linseed in Iraq.*—In recent years the Department of Agriculture in Iraq has carried out trials with both Linseed and Flax and has shown that both can be profitably raised under the conditions prevailing in Iraq. Flax, however, is regarded as a difficult crop to introduce among the native cultivators owing to the care and attention required in harvesting, retting, and scutching the fibre, and, since 1925, attention has been transferred almost entirely to Linseed. Varieties of Linseed from the more important Linseed-producing countries of the world such as India, the Argentine, and Morocco, have been cultivated at the Rustam Experiment Farm. The Indian varieties gave high yields at first but subsequently proved to be very liable to attack by rust with consequent reduction in yield and quality of the seed. Damage from rust attack, often exceeding 50 per cent. of the normal crop, was found to be more severe than was the case in India. In contrast with the Indian varieties the Moroccan and South American varieties proved to be entirely immune to the disease. The Moroccan varieties showed themselves to be superior in yield to the South American, and cultivators are advised to grow only the Moroccan and South American.

The average oil content of Moroccan Linseed grown at the Experiment Farm over a period of years was found to be in the neighbourhood of 38 per cent. This compares favourably with that of seed from the usual trade sources (Bombay 42 per cent.; Calcutta 39 per cent.; South America 35-38 per cent.; Russia 33 per cent.). Yields at the Experiment Farm varied from 600 to 1200 lbs. per acre during the period 1924-29, with an average yield of about 820 lbs. per acre. The soil of the experiment plots was regarded as poor compared with that in many parts of Iraq, which should be able to produce higher yields. On the other hand, in the provinces the crop would probably not receive such careful supervision nor be so well cultivated and cleanly harvested as was the case at the Experiment Farm. It is considered that for Iraq an average yield of 800 lbs. to the acre should be possible.

F. N. H.

Botanical Magazine.—Part ii of vol. cliv (1928) has now been published and contains the following plates:—*Cymbidiella Humblotii* Rolfe (t. 9216), a Madagascar Orchid of the genus complementary to *Cymbidium* of Asia, figured from a plant grown at Kew; *Rhododendron didymum* Balf. f. & Forrest (t. 9217), distinguished from *R. haemaleum* only by the presence of glandular leaves, a native of north-western Yunnan; *Primula Angleniana* Balf. f. & Forrest (t. 9218), one of the finest of the Nivales-primulas, with fragrant, creamy-yellow, orange-throated flowers, from the mountains of Yunnan; *Caryopteris mongolica* Bunge (t. 9219), from Kansu,

*The Cultivation and Marketing of Linseed, by E. Guest. Iraq Dept. of Agric. Bull. No. 21. Govt. Press, Baghdad, 1930.

Chili, figured from a plant grown at Kew; *Iris Winogradowii* Fomin (t. 9220), resembling a yellow-flowered form of *I. reticulata*, known only from a very limited area in western central Georgia; *Rhododendron Amesiae* Rehder & Wilson (t. 9221), with a rich magenta-purple corolla, from western Szechuan; *Epigaea asiatica* Max. (t. 9222), from Japan; *Aster Farreri* W. W. Smith and J. F. Jeffrey (t. 9223), a perfectly hardy plant from north-eastern Tibet; *Tremacron Forrestii* Craib (t. 9224) from north-west Yunnan and south-west Szechuan, the plant figured representing the type of the genus separated from *Didissandra*; *Kniphofia insignis* Rendle (t. 9225), a common constituent of the grass-steppe of the Arussi highlands, Abyssinia, with pure milk-white flowers turning pinkish-grey on fading, figured from a plant raised at Kew; *Papaver macrostomum* Boiss. & Huet (t. 9226), with flowers of a deep red-purple and a marked sheen, native of Anatolia, Armenia, and western Persia.

British and Foreign Trees and Shrubs in Cornwall.*—

This book is the outcome of several years' work by Mr. Edgar Thurston, during which he visited various estates and gardens in Cornwall where note was made of the many interesting native and exotic trees and shrubs that flourish so well in the county. He was assisted in his work by several friends, and many owners of gardens co-operated by giving him all the assistance possible. From time to time notices have appeared in various periodicals recounting the trees in isolated gardens and in groups of gardens, but no attempt has previously been made to enumerate in such a thorough manner the trees and shrubs which are hardy in Cornwall. On paying his first visit to Cornish gardens, the northern gardener is amazed to find many plants growing luxuriantly out of doors that he has never previously met with except in glasshouses; groves of tree ferns, rhododendrons of tree-like proportions, Australian acacias, eucalyptus trees 50 or 60 feet high, large specimen palms and cordylines are a revelation to him.

In the first 23 pages of his introductory matter, Mr. Thurston deals at some length with the peculiarly favourable position of Cornwall for the cultivation of semi-hardy trees and shrubs, and gives considerable details of climatic conditions, contrasting the temperatures with various towns in Southern Europe. He then gives historical references to the ancient woods and famous trees of Cornwall, and recounts the replies sent by the incumbents of the Diocese of Exeter to the Bishop when, in 1727, 1746 and 1806, he asked for a return of the number and value of all trees growing in the churchyards or on glebe land. Several pages are then devoted to the evidence of woods afforded by place-names in the middle ages. Chapter iii deals with the hedges of Cornish parks, and amongst

*By Edgar Thurston. Published on behalf of the Royal Institution of Cornwall by the Cambridge University Press, Fetter Lane, London, 1930, pp. xi. + 287, plates 42. Price 12s. 6d. net.

other items it is learned that respecting "Liskeard and Restormel Parks, Reeve's account, Edward III, 1348-9, some hedges were remade at a cost of 1½d. a perch and the old wood." Chapter iv recounts Cornish names of native trees and shrubs. Chapter v is descriptive of various Cornish parks and gardens, whilst the rest of the book is devoted to an alphabetical list of the genera and species of trees and shrubs found in the County, with, in most instances, the dimensions of specially noticeable specimens and an indication of where they are growing.

Of the illustrations special mention may be made of Plate xxxviii, p. 251, which depicts what is perhaps the finest plant of *Dacrydium Franklinii* in the British Isles. This is a particularly graceful plant growing at Penjerrick. Plate xxiv, p. 157, is also of considerable interest. Not only does it show fruits of *Musa Basjoo* growing out of doors, but it gives an excellent photograph of that fine old Cornish gardener, Mr. Jenkins, who for many years has served the Fox family so faithfully at Rosehill, Falmouth, a garden famed even amongst Cornish gardens for its wonderful collection of New Zealand, Australian and Himalayan trees and shrubs.

Mr. Thurston is to be congratulated upon the production of an exceedingly useful work of reference, and he has been well supported by the publishers.

W. D.

Plants of the Gold Coast.*—The author, who is Master of Agriculture and Biology in Achimota College, has compiled a list of some 1200 flowering plants of the Gold Coast and Ashanti. This number naturally falls far short of those actually known, apart from the fact that those of the Northern Territories are not included. The arrangement is alphabetic, from *Abutilon* to *Zornia*, each species having a short description with vernacular names and generally with economic or popular uses. This portion occupies over two-thirds of the book, and is the part most likely to be consulted by persons already possessed of some botanical knowledge and a desire to identify any plant. It is illustrated by 36 excellently reproduced photographs showing types of vegetation or individual species, and 34 line drawings. The latter vary in merit but are sufficiently accurate to be of assistance.

The chief feature of the book is the lists of vernacular names, and the collection and verification of these could only be achieved by enthusiasm added to accurate linguistic knowledge. Some 3,000 names are given, printed in the still unfamiliar script of the International Institute of African Languages, and are collected in an index of the four chief language groups of the Gold Coast with their dialects. The work claims to be an effort to satisfy both African and European inquirers. Within these difficult limits it succeeds, but the uncertainty left after looking up the word *bohwe* (to take one example) and finding that it refers to 4 unrelated plants suggests its

*Plants of the Gold Coast, F. R. Irvine. Oxford University Press, 1930, pp. lxxix + 521. Price 5s.

limitations. The names given for *Afrormosia* all belong properly to *Distemonanthus*. A long list of economic plants arranged under 23 headings gives a bird's-eye view of native uses.

In a book on Gold Coast plants it is regrettable that *Cola acuminata* should be described as the "True or Commercial Cola Nut," and that *C. vera* should be given incorrectly as its synonym. The most valued nut of commerce is the indigenous Ashanti species *C. nitida* A. Chev. (syn. *C. vera* K. Schum.), which receives bare mention. The work suffers from immaturity. Errors, mostly of no great importance, some possibly attributable to the printer, are rather numerous. Had the author been able to await publication of Vol. 2 of the Flora of West Tropical Africa many of these would have been avoided, and his list of species so far known from the Gold Coast could have been made more complete.

J. M. D.

The Cactus Book.*—Although primarily intended for the American amateur, this little book by Dr. Houghton contains much useful information for Cactus lovers in this country. The contents are divided into sixteen chapters. In those dealing with seed raising, propagation by cuttings and grafting, watering and soil, the advice is practical and instructive, and should be of great assistance to all who contemplate making a collection.

The least valuable portions of the book, to the English amateur, are the chapters on Rock-Gardening and Acquiring and Trading. In the conspectus of species at the end of the volume many generic names appear with which we are not acquainted. This difference in the usage of names between America and Europe is apt to cause much confusion and annoyance. For instance *Phyllocactus* is not recognised and all the species and hybrids are placed under *Epiphyllum*, whereas the well-known *Epiphyllum truncatum* is now *Zygocactus truncatus*.

T. W. T.

Wild Flowers of Kashmir.†—Mr. Coventry has published a third series of beautifully reproduced autochrome pictures of 50 Kashmir plants with an autochrome frontispiece depicting a fairy-like scene in the Liddar Valley with *Cremanthodium* and *Corydalis* flowering in the bed of a glacial stream. The present series is of as high a standard as the previous two, and contains additional textual matter, which constitutes an improvement.

Nearly all the plants figured grow at elevations of over 8,000 ft., and should be hardy and suitable for English gardens, where their beauty will make them welcome. The book itself is an adornment to any library shelf.

C. E. C. F.

*By Dr. Arthur D. Houghton. The Macmillan Co., New York, 1930, pp. xii+147, ill. 18. Price 10s.

†Wild Flowers of Kashmir. Series iii, by B. O. Coventry. Raithby, Lawrence & Co., London, 1930, pp. xxix+100, 51 coloured plates. Price 16s.

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